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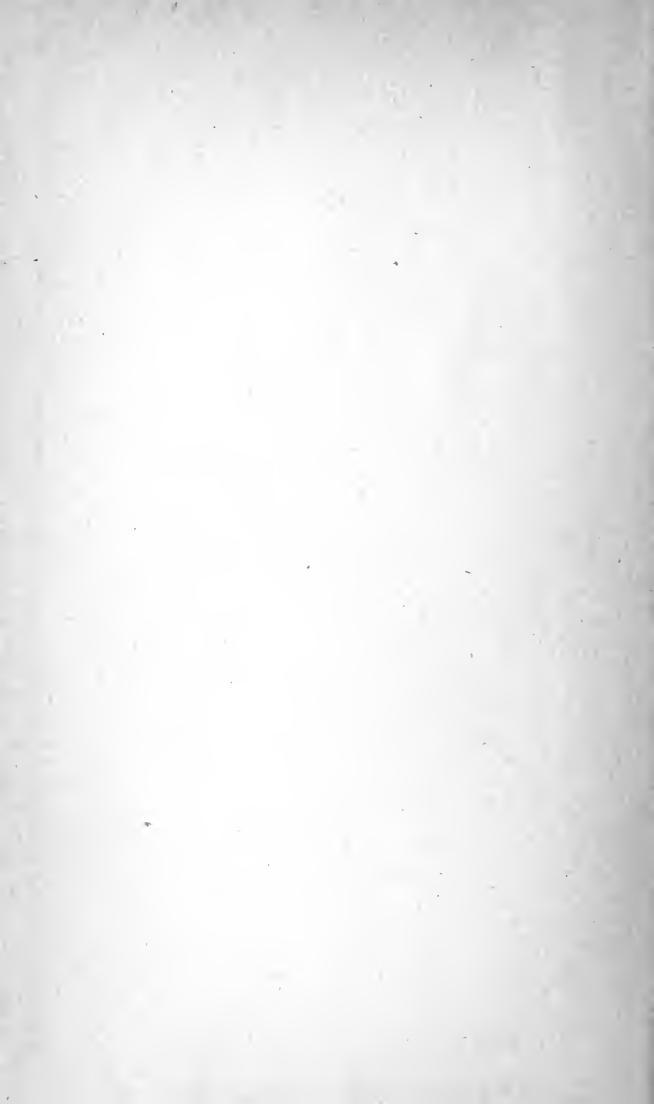
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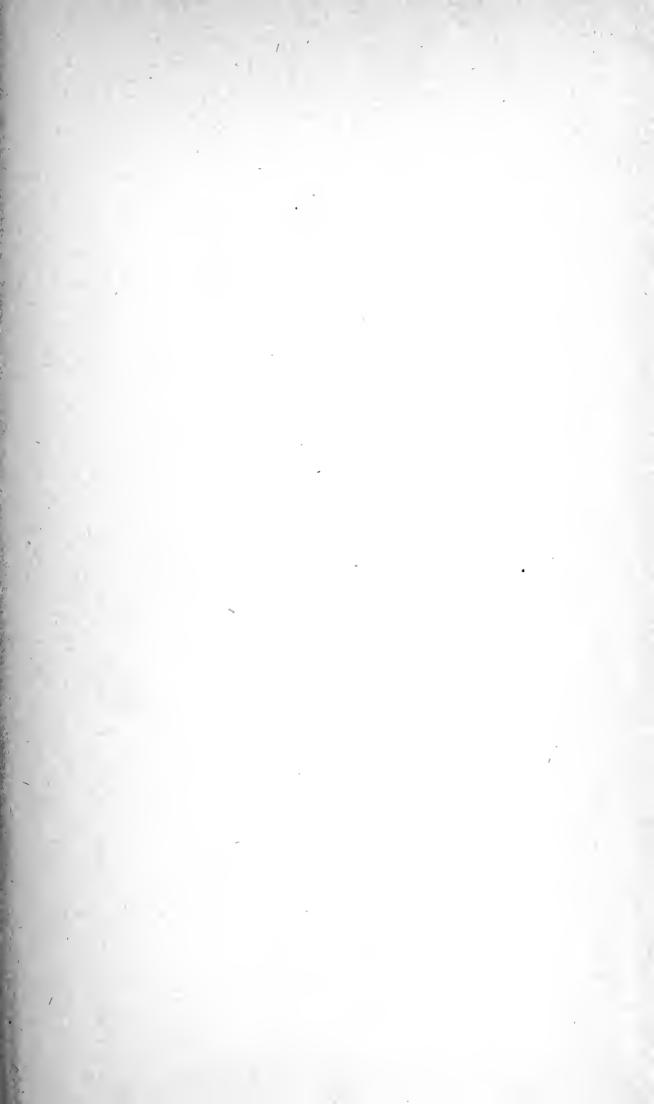


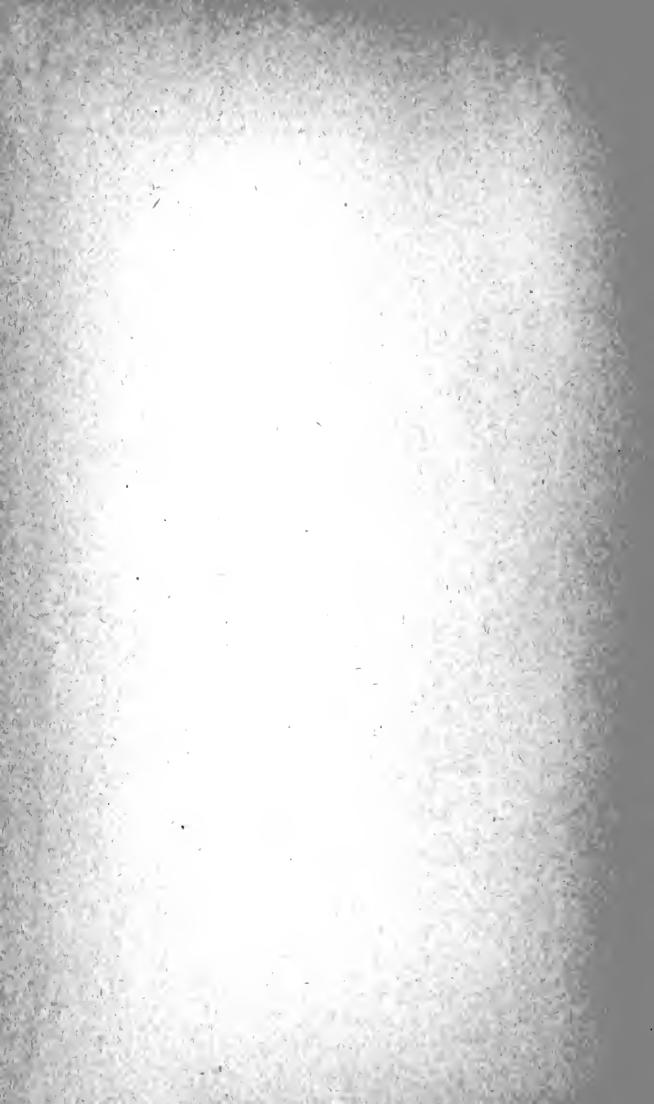


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# U. S. DEPARTMENT OF AGRICULTURE. DIVISION OF ENTOMOLOGY.

### BIBLIOGRAPHY

OF

### THE MORE IMPORTANT CONTRIBUTIONS

TO

### AMERICAN ECONOMIC ENTOMOLOGY.

PREPARED. BY AUTHORITY OF THE SECRETARY OF AGRICULTURE,

BX

SAMUEL HENSHAW.

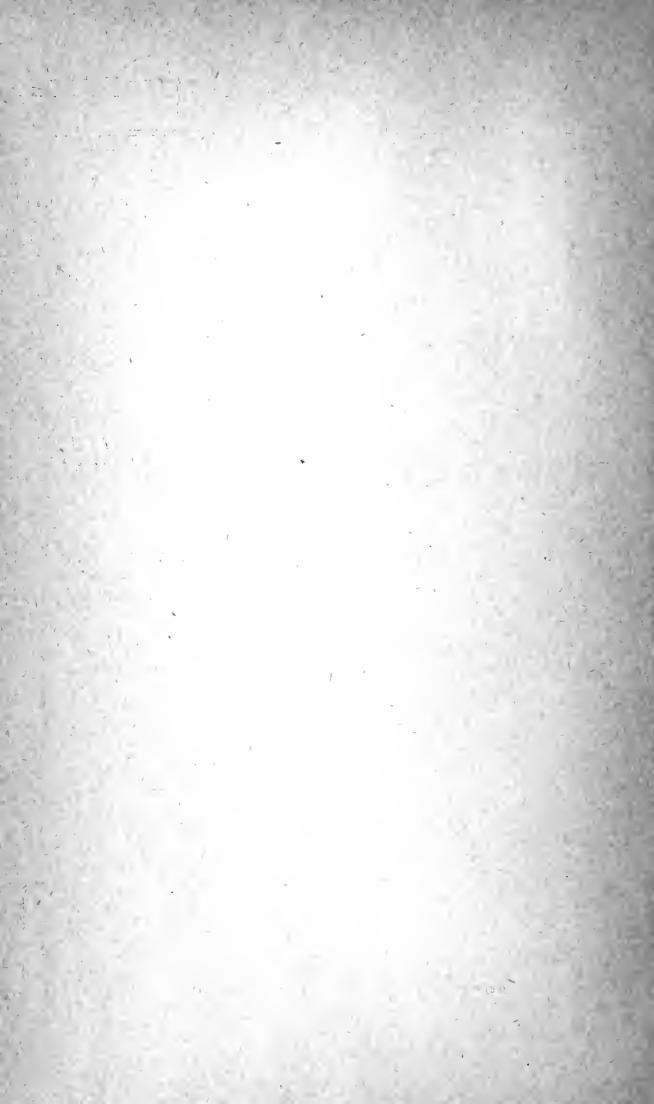
Parts I, II, and III.

THE MORE IMPORTANT WRITINGS

BENJAMIN DANN WALSH

CHARLES VALENTINE RILEY.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.



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BY

SAMUEL HENSHAW.

PART I.

THE MORE IMPORTANT WRITINGS

OF

BENJAMIN DANN WALSH.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

#### FORTY-SEVENTH CONGRESS, FIRST SESSION.

| Congress of the United States, In the House of Representatives, June 24, 1882.

Resolved, By the House of Representatives (the Senate concurring) that there be printed, for the use of the Department of Agriculture, one thousand copies of a special report, entitled "Bibliography of Economic Entomology."

Attest:

EWD. McPherson, Clerk.

Passed the Senate July 6, 1882.

F. E. Shober,
Acting Secretary.

A true copy.

EWD. McPherson, Clerk.

2

#### LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF ENTOMOLOGY,
Washington, D. C., June 12, 1889.

SIR: In the absence of Professor Riley, who is now at the Paris Exposition in official capacity, I beg to submit for publication Parts I, II, and III of the Bibliography of American Economic Entomology, which was ordered by Congress in July, 1882. Owing to various unforeseen delays this work has not yet been completed. Its preparation was originally assigned by Professor Riley to Mr. B. Pickman Mann, formerly of this Division, and upon the severance of his connection with the Department, in the fall of 1885, it was turned over in an incomplete and fragmentary condition to Mr. Samuel Henshaw, of Boston, who has added greatly to it and practically rewritten the portions already prepared.

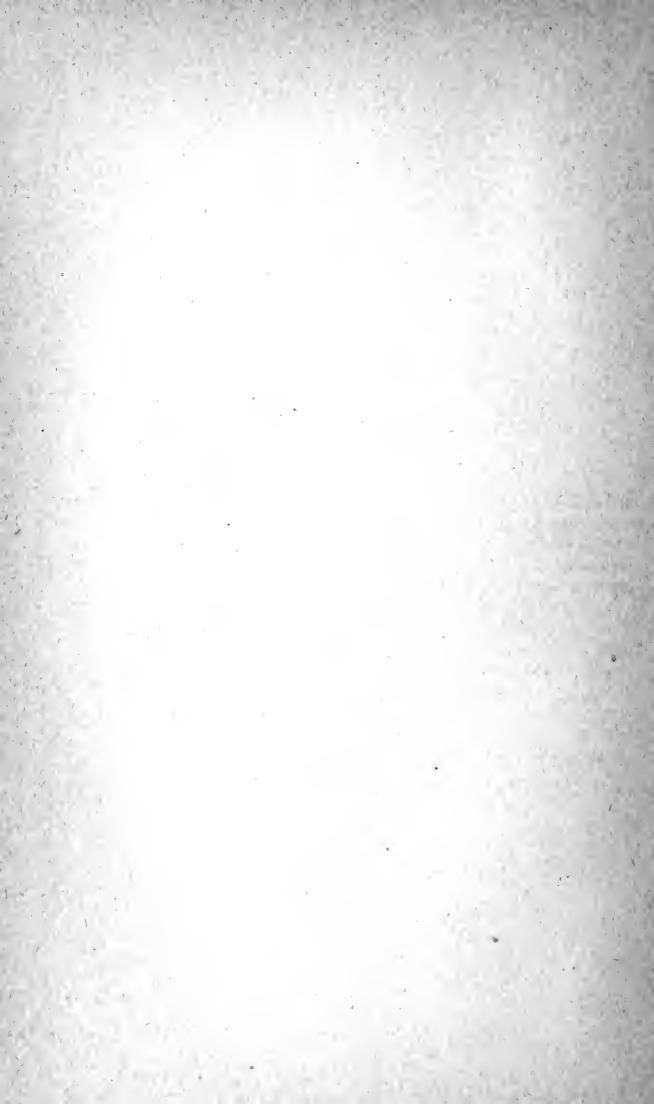
The extent of the work renders it advisable to publish it in several parts, and as there is unquestionably a more urgent need on the part of working economic entomologists for a bibliography of the writings of B. D. Walsh and C. V. Riley than of others, on account of their great number and value, these portions have been finished first. Their immediate publication will probably antecede the publication of the final part only by a few months.

Very respectfully, yours,

L. O. HOWARD,

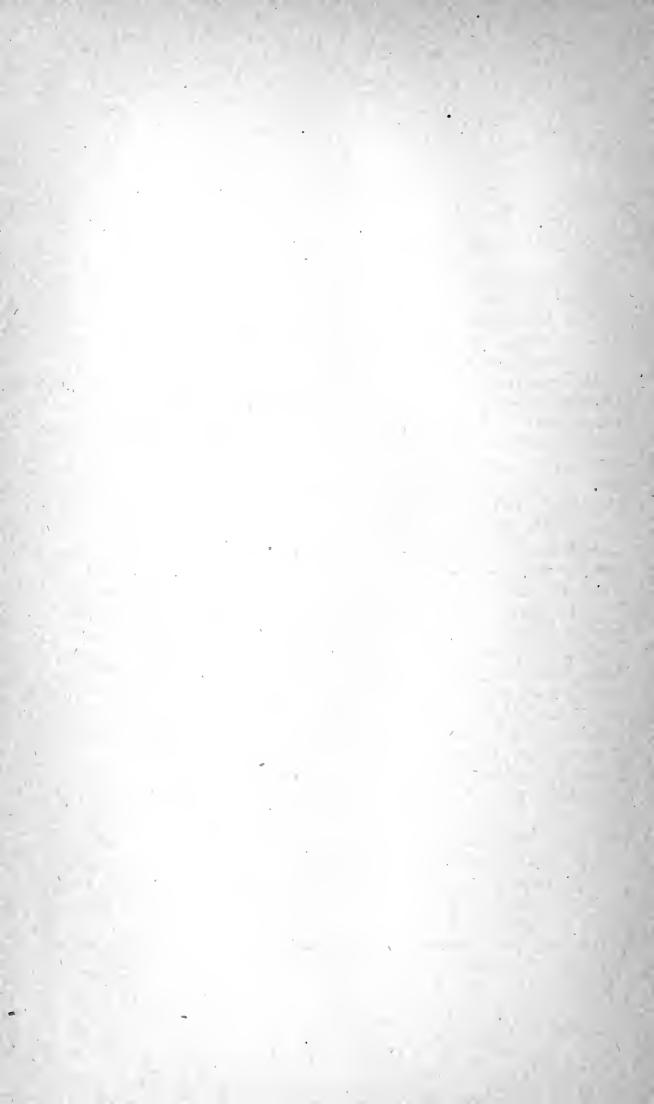
Acting Entomologist.

Hon. J. M. Rusk, Secretary of Agriculture.



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#### INTRODUCTION TO PARTS I, II, AND III.

The object of the present lists is to record the principal entomological writings of B. D. Walsh and C. V. Riley. Few will be likely to criticize the association of the names of Walsh and Riley in a list of this kind, so largely devoted to economic entomology, or to question the desirability of collating their writings in advance of others.

As recognized authorities upon entomology, especially from an economic standpoint, their writings have been extensively quoted sometimes with, but frequently without, credit in the agricultural and horticultural journals of the day. These secondary references, though of a certain value when the original is inaccessible, have, as a rule, been omitted. In citing such as are given I have used my personal judgment. To have given all would have increased the size of the list considerably with but a slight increase in its usefulness.

Occasionally, a publisher to meet some popular demand puts the writings of an author into book form without the knowledge of the latter. Such an occurrence has happened more than once with Dr. Riley's writings. To mention but one: In 1877 Messrs. George Rutledge & Sons, of London, published "The Colorado beetle, with suggestions for its repression and methods of destruction," with Dr. Riley's name upon the title-page as author. This is a partial reprint of Potato Pests entirely unsanctioned and published without knowledge of the author. (See *London Times*, October 17, 1887.) These publishers' reprints are omitted from this list. The "S.-b." after the reference of many of the articles from the agricultural and other journals refers to the series of scrap-books used in divisional work.

A biographical sketch of Dr. Walsh is given in the second volume of the *American Entomologist*, Vol. II, No. 3, pp. 65-68, January, 1870.

The chief facts in Dr. Riley's life may be found in the "Commonwealth of Missouri" (1875) and the National Farmer, September 20, 1883.

In the preparation of the list I have freely used all data accumulated by the Division, notably the work of Mr. B. P. Mann and a private list of Dr. Riley's.

Many persons, both within and without the Department, have kindly answered my inquiries.—S. H.

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## BIBLIOGRAPHY OF THE MORE IMPORTANT CONTRIBUTIONS TO AMERICAN ECONOMIC ENTOMOLOGY.

#### THE WRITINGS OF B. D. WALSH (1860-1873).

- 1. Walsh, B. D. Bark-lice. <Western Rural. S.-b. No. 3, p. 11. Habits of Lecanium compared with Aspidiotus [=Mytilaspis].
- 2. Walsh, B. D. Entomological notes. < Prairie Farmer, 17 May, 1860, [v. 21], n. s., v. 5, pp. 308-309, figs. S.-b. No. 1, pp. 42-43.
  - Notice of Coccus harrisii n. sp. [=Chionaspis furfurus]; figure of its scales; description and figure of Capsus oblineatus [=Lygus pratensis] infesting apple, quince, and pear trees; figure of larva case and image and description of Phycita nebulo [=Acrobasis indiginella]; figures of image and of injuries of Amphicerus bicaudatus; habits of the same and of Scolytus [=Xyleborus] pyri, Saperda bivittata [=candida] and Chrysobothris femorata; means against the last.
- 3. Walsh, B. D. "Cutworms." < Prairie Farmer, 9 August, 1860, [v. 22], n. s., v. 6, pp. 82-83, fig. S.-b. No. 1, pp. 84-85.
  - Account of the larvæ of Lachnosterna quercina [=fusca] of Elateridæ of Agrotidæ and of Pangus [=Harpalus] caliginosus; figures of larvæ and imagos of the same or allied species; also of Heteronychus [=Ligyrus] relictus, Lopha [=Bembidium] 4-maculatum and Agonoderus pallipes.
- 4. Walsh, B. D. [*Ips quadrisignatus*, Say.] < Prairie Farmer, 1860, [v. 22], n. s., v. 6, p. —.
  - Ips 4-signatus [=fasciatus] attacks growing ears of sweet corn.
- 5. Walsh, B. D.] "Insect Life." < Proc. Agric. Conv.; Ann. meeting Ill. Nat. Hist. Soc.; Comm. Exerc. State Normal Univ. [Bloomington, Ill.], 1860, pp. 11-12.
  - Report, compiled from Chicago papers of address delivered before the Illinois Natural History Society; comparison between injurious insects and an invading army; necessity of appropriations for carrying on entomological work; economic entomology in Europe; importance of beneficial insects.

- 6. Walsh, B. D. Insects injurious to vegetation in Illinois. < Trans. Ill. State Agric. Soc., September, 1861, v. 4, pp. 335-378, figs. 1-11. Separate: 1861, 43 pp., 1 pl. Reprint in part: < Trans. Ill. Nat. Hist. Soc., v. 1. Prairie Farmer, 6 December, 1861, [v. -], n. s., v. -, pp. 370-371.
  - Ravages of injurious insects; enemies of the same; notes on Cecidomyia destructor, Saperda bivittata [=candida], Chrysobothris femorata, Conotrachelus nemphar and Blissus leucopterus; natural history, ravages and means against Leucania unipuncta; figures its larva, pupa and imago; descriptions and figures primary and secondary parasites of the army-worm; figures Hippodamia (=Megilla) maculata, Coccinella munda [=sanguinea] and a larval coccinellid.
- 7. Walsh, B. D. From Benj. D. Walsh. < Illinois Farmer, October, 1861.
  - Denies statement attributed by C. Thomas (Illinois Farmer, September, 1861), that he (Walsh) believed in the hibernation of the pupa of *Leucania unipuncta*.
- 8. Walsh, B. D. The army-worm question. < Prairie Farmer, 5 December, 1861, [v. 24], n. s., v. 8, pp. 370-371. S.-b., No. 4, p. 22. Replies to arguments of C. Thomas (Prairie Farmer, 1861, v. 8, pp. 306-307),

on the hibernation of Leucania unipuncta.

- 9. Walsh, B. D. The army-worm question. Mr. Walsh's reply. < Field Notes, 14 December, 1861.
  - Controversial answer to the assertion of J. H. Klippart (Field Notes, 30 November, 1861), that the larvæ of Leucania unipuncta are viviparous.
- 10. Walsh, B. D. The army-worm and its enemies. <Prairie Farmer, 1861, [v. 24], n. s., v. 8, p. 4. Reprint: <Trans. Ill. Nat. Hist. Soc., v. 1. Prairie Farmer, 6 December, 1861, [v. 24], n. s., v. 8, pp. 370-371.
  - Popular account of some of the parasites of Leucania unipuncta.
- 11. Walsh, B. D. The army-worm. <Prairie Farmer, 1861, [v. 24], n. s., v. 8, pp. 257-258. Reprint: <Trans. Ill. State Agric. Soc., 1861, v. 4, pp. 373-375.
  - Hibernation of the egg; spring burning as a means against Lucania unipuncta; description of Hockeria [=Haltichella] perpulchra n. sp.; notes on other parasites.
- 12. Walsh, B. D. The army-worm and its insect foes. <Prairie Farmer, 1861, [v. 24], n. s., v. 8, pp. 322-323; 337-339; 354-355.
  - Habits and description of larva and imago of Leucania unipuncta; hibernation of the egg; figures of larva, pupa and imago; also of Exorista [=Nemoræa] leucaniæ, Pezomachus minimus, Microgaster [=Apanteles] militaris, Hockeria [=Haltichella] perpulchra and Glyphe viridascens.
- 13. Walsh, B. D. Bug preying on honey-bee. <Prairie Farmer, 1861. S.-b., No. 4, p. 7.

Unknown heteropteron, said to prey on Apis mellifica.

- 14. WALSH, B. D. The pea and its insect foe. <Prairie Farmer, 1861. S.-b., No. 4, p. 12.
  - Unknown leaf-miner and leaf-eater on pea; directions for rearing insects.
- 15. Walsh, B. D. The grain weevil. <Journ. Ill. State Agric. Soc., January, 1862, fig. Reprint: <Trans. Ill. State Agric. Soc. v. 5, pp. 484-485.
  - Sitophilus [= Calandra] remotepunctata infests wheat.
- 16. Walsh, B. D. [Ithycerus noveboracensis.] <St. Louis Valley Farmer, March, 1862, v. 14, pp. 82–85, fig.

  Ithycerus noveboracensis attacks twigs of fruit trees in nurseries.
- 17. Walsh, B. D. [Army-worm.] <St. Louis Valley Farmer, 1862, v. 14, p. 161.
  - Correction of mistake of E. S. Washington (St. Louis Valley Farmer, 1862, v. 14, p. 161), who mistook parasitic larvæ for young *Leucania unipuncta*; economy of parasites of army-worm.
- 18. Walsh, B. D. [Brachytarsus variegatus.] < Journ. Ill. State Agric. Soc., March, 1862, pp. 8-12, fig.

  Brachytarsus variegatus parasitic (2) on a large orange-colored cecidomyid (2)

Brachytarsus variegatus parasitic (?) on a large orange-colored cecidomyid (?) larva in stems of wheat.

- 19. Walsh, B. D. A new insect in wheat, *Bruchus*. <Journ. Ill. State Agric. Soc., April, 1862. Reprint: <Trans. Ill. State Agric. Soc., v. 5, pp. 485–490.
- 20. Walsh, B. D. [Two apple-tree borers.] < Journ. Ill. State Agric. Soc., June, 1862, pp. 21-23.

  Treats of Chrysobothris femorata and Saperda bivittata [= candida].
- 21. Walsh, B. D. [Colorado potato beetle.] <St. Louis Valley Farmer, July, 1862, pp. 209-210. Reprint (?): <Prairie Farmer, 6 June, 1863, v. —, p. 356, fig.
  - Doryphora 10-lineata infests egg plants, potato and tomato vines, etc., in Kansas and Iowa.
- 22. Walsh, B. D. Fire-blight. Two new foes of the apple and pear. <Prairie Farmer, 6 September, 1862, [v. 26], n. s., v. 10, pp. 147-149, fig. Separate: pp. 4.
  - Eire-blight defined; probably caused by attacks of Chloroneura malefica [=Empoasca viridescens] and C. maligna [=E. obtusa]; characters, habits, and ravages of the same; synoptic separation of several genera of Typhlocybini; two (2) new genera and thirteen (13) new species are described. For a list of the same see the Systematic Index. The figures show C. malefica and C. maligna and the venation of allied forms.
  - (Note.—The descriptive portion with figures is reprinted in Proc. Bost. Soc. Nat. Hist., February, 1864, v. 9, pp. 314-318.)
- 23. Walsh, B. D. Plant lice, the corn-root louse, a new enemy to the corn. <Journ. Ill. State Agric. Soc., September, 1862, pp. 8-13, fig. Reprint: <Trans. Ill. State Agric. Soc., v. 5, pp. 491-497, fig.
  - Aphis maidis (?) infests the roots of young Indian corn as well as the stems of the roasting ears.

- 24. Walsh, B. D. List of the Pseudoneuroptera of Illinois contained in the cabinet of the writer, with descriptions of over forty new species, and notes on their structural affinities. <Proc. Acad Nat. Sci. Phil., September, 1862, pp. 361-402.
  - One hundred and nine (109) species are enumerated; two (2) new genera and forty (40) new species are described. For a list of the same see the Systematic Index.
- 25. Walsh, B. D. [Erythroneura tricincta Fitch.] < St. Louis Valley Farmer, October, 1862, pp. 305-306, fig.
  - Erythroneura [=Typhlocyba] tricincta on grape-vines.
- 26. Walsh, B. D. Grasshoppers and locusts. < Journ. Ill. State Agric. Soc., November, 1862, pp. 1-3. Reprint: < Trans. Ill. State Agric. Soc., v. 5, pp. 497-499.
  - Injuries of locusts in the Mississippi Valley; differences between locusts and Cicadas.
- 27. Walsh, B. D. On the genera of *Aphidæ* found in the United States. < Proc. Ent. Soc. Phil., December, 1862, v. 1, pp. 294–311, figs. 1–8.
  - Synoptic separation of the genera; list of seventy (70) species found in the United States, with food habitat; Aphis [= Nectarophora] rudbeckie Fitch, A. vitis? Scop., A. maidis? Fitch,  $Lachnus\ carye$  Harris,  $Thelaxes\ [= Colopha]$  ulmicola Fitch are described; one (1) new genus and eleven (11) new species are described; see the  $Systematic\ Index$  for a list of the same; the figures show venation and other details. Two (2) new ants,  $Formica\ aphidicola\ and\ F.\ [= Lasius]\ latipes$ , are described.
- 28. Walsh, B. D. [Observations on *Papilio glaucus* and *P. turnus*.] < Proc. Ent. Soc. Phil., February, 1863, v. 1, pp. 349–352.
  - Reasons for considering turnus and glaucus identical; the latter a dimorphic Q of the former; distribution of the two forms; citation of similar case among Pieridw and of analogous one among Dytiscidw; description of larva from which a black Q was raised.
- 29. Walsh, B. D. [Katydid eggs.] < Prairie Farmer, 28 February, 1863, [v. 27], n. s., v. 11, p. 132, fig.
  - Oviposition of katydid eggs on apple-twigs.
- 30. Walsh, B. D. Fire-blight. < Prairie Farmer, 4 April, 1863, [v. 27], n. s., v. 11, p. 212, fig. S.-b., No. 1, p. 10.
  - Description and figures of eggs of Chloroneura malefica [= Empoasca viride-scens] and the slits in which they are deposited in apple-twigs; cause of fire-blight; suggestion of remedies.
- 31. Walsh, B. D. Insects injurious to fruit trees. < Prairie Farmer, 2 May, 1863, [v. 27], n. s., v. 11, p. 276, fig. S.-b., No. 1, p. 9.
  - Fruit and foliage of pear-trees destroyed by Capsus oblineatus [=Lygus pratensis]; description and figure of imago; habits, food-plants, and remedies.
- 32. Walsh, B. D. The ten-striped spearman. < Prairie Farmer, 6 June, 1863, [v. 27], n. s., v. 11, p. 356, fig. S.-b., No. 1, p. 7.
  - History, ravages, and means against *Doryphora* 10-lineata; figure of imago; mentions other injurious *Phytophaga*.

- 33. Walsh, B. D. The plum-gouger; a new foe of the plum. < Prairie Farmer, 13 June, 1863, [v. 27], n. s., v. 11, pp. 372–373, figs. 1–3. S.-b., No. 1, p. 6.
  - Habits, description, and figures of Anthonomus? prunicida n. sp. [= Coccotorus scutcllaris], injurious to plums; comparison with Conotrachelus nenuphar; figure of the latter.
- 34. Walsh, B. D. The plum-gouger. < Prairie Farmer, 11 July, 1863, [v. 28], n. s., v. 12, p. 21, 2 figs. S.-b., No. 1, p. 10.
  - Distribution and ravages of Anthonomus prunicida [= Coccotorus scutellaris]; list of insects found on plum-trees; description of Conotrachelus puncticollis n. sp. [= C. geminatus]; usefulness of Reduvius raptatorius [= Sinca diadema]; figures A. prunicida and R. raptatorius.
- 35. Walsh, B. D. A new fruit foe. < Prairie Farmer, 18 July, 1863, [v. 28], n. s., v. 12, p. 37, fig. S.-b., No. 1., p. 11.
  - Description and figure of imago of *Epicærus imbricatus*; injuries to fruit trees and gooseberry-bushes; supposed habits of this and allied species; hibernation of the larva of *Conotrachelus*; description of *C. cratægi* n. sp.
- 36. Walsh, B. D. Leaf-hopper. < Prairie Farmer, 25 July, 1863, [v. 28], n. s., v. 12, p. 53.
  - Proconia [= Oncometopia] undata injurious to grape-vines in southern Illinois; its eggs laid in twigs.
- 37. Walsh, B. D. Locust borers. < Prairie Farmer, 15 August, 1863, [v. 28], n. s., v. 12, p. 101. S.-b., No. 1, p. 12.
  - Description and habits of Clytus [= Cyllenc] robiniæ; Clytus of Carya does not attack Robinia; Cossus robiniæ mentioned; larvæ and imagos of Nitidulidæ found under decaying bark.
- 38. Walsh, B. D. Insect friends and insect foes. The twice-stabbed lady-bird. <Prairie Farmer, 1863, [v. 28], n. s., v. 12; 22 August, p. 117, figs. 1, 2; 29 August, p. 133, figs. 3, 4. S.-b., No. 1, pp. 11–12.
  - Description and figure of imago of Chilocorus bivulnerus; figure of larva; destruction of injurious insects by predaceous insects; brief description of and means against Lytta cinerea [= Macrobasis unicolor], found on potato, English bean, and apple, and L. [= Epicauta] vittata, on potato; figures Lytta atrata [= Epicauta pennsylvanica], found on aster and potato, and larva-cases of Solenobia sp. from under bark of apple-trees; note on allies of Solenobia.
- 39. Walsh, B. D. Observations on certain N. A. Neuroptera, by H. Hagen, M. D., of Kænigsberg, Prussia; translated from the original French MS., and published by permission of the author, with notes and descriptions of about twenty new N. A. species of Pseudoneuroptera. < Proc. Ent. Soc. Phil., October, 1863, v. 2, pp. 167-272, fig.
  - Dr. Hagen's comments relate to the species described in No. 24; the author's notes supplement these and describe three (3) new genera and twenty-three (23) new species; for a list of these, see the Systematic Index; descriptions of previously described species, with notes on their habits, distribution, etc., are also given; Batis interlineata [=Siphlurus femoratus] is proposed

- 39. Walsh, B. D.—Continued.
  - (p. 190) in case B. [=S.] femorata Walsh is distinct from B. [=S.] femorata Say; in a note (p. 255) Ophiogomphus mainensis n. sp. is described from Packard's manuscript; the venation of the Odonata and the terminal abdominal characters of Sialis infunata are figured.
- 40. Walsh, B. D. On certain remarkable or exceptional larvæ, coleopterous, lepidopterous, and dipterous, with descriptions of several new genera and species, and of several species injurious to vegetation, which have been already published in agricultural journals. < Proc. Bost. Soc. Nat. Hist., February, 1864, v. 9, pp. 286-318.
  - Habits of the larva of Cotalpa lanigera, Pelidnota punctata, Cratonychus [= Melanotus] incertus, and Xyloryctes satyrus; comparative characters of the larva and imago of Halisidota antiphola n. sp. [= tessellaris]; description of larva, pupa, and imago of Sphingicampa (n. g.) distigma n. sp. [= bicolor]; characters and affinities of Dryocampa [= Sphingicampa] bicolor?; description of imagos of Limacodes scapha and L.? [= Phobetron] hyalinus n. sp., and of larva of the last and L.? [= Phobetron?] tetradactylus n. sp.; description of the larva, pupa, and imago of Hipparchiscus n. g. venustus n. sp. [= Aplodes mimosaria]; habits and description of the larva of an undetermined Tabanus, description of the pupa; description of the larva, pupa, and imago of Midas fulvipes n. sp., habits of its larva. On pp. 309-318 descriptions of several new species, with brief notes of food-habits, etc., are reprinted from various agricultural journals.
- 41. Walsh, B. D. On dimorphism in the hymenopterous genus *Cynips*; with an appendix containing hints for a new classification of *Cynipidw* and a list of *Cynipidw*, including descriptions of several new species, inhabiting the oak-galls of Illinois. <Proc. Ent. Soc. Phil., March, 1864, v. 2, pp. 443-500, fig.
  - Detailed observations proving the frequent occurrence of dimorphism in the Cynipida; Cynips [= Amphibolips] aciculata, a dimorphic form of C. q. spongifica; concludes from analogy "that aciculata Q generates galls which produce by parthenogenesis  $\mathcal{E}$  spongifica exclusively, and that  $\mathcal{Q}$   $\mathcal{Q}$  spongifica coupling in June with these & & oviposit in the same month in the young bads of the oak, the eggs lying dormant till the following spring, when some of the eggs produce Q spongifica in June, and some Q aciculata in the autumn or early in the following spring, which last in their turn, as before mentioned, generate & spongifica to appear in the following June;" interesting details concerning the history of the group are given; relations between the true gall-flies (Psenides) and parasitic Cynipidæ (Inquilinæ); classification and characters of the same; anatomical structure and homologies of the family; the list includes fifteen (15) species inhabiting the various oaks, with descriptions of their galls and of several new species; seven (7) species of Inquilina are described; for the new species, see the Systematic Index; the figures illustrate the anatomy of the abdomen and ovipositor.
- 42. Walsh, B. D. The four-humped Curculio. A new foe of the apple. <Valley Farmer. Reprint: <Prairie Farmer, 27 August, 1864, [v. 30], n. s., v. 14, p. 131, 2 figs. S.-b., No. 1, p. 28.
  - Description and figures of Anthonomus quadrigibbus, a foe of the apple; comparison with Conotrachelus nenuphar and Anthonomus pruvicida [= Coccotorus scutellaris].

43. Walsh, B. D. On the pupa of the ephemerinous genus Batisca Walsh. <Proc. Ent. Soc. Phil., August, 1864, v. 3, pp. 200-206, fig.

Description and figures of the pupa of Bætisca obesa Say.

44. Walsh, B. D. On certain entomological speculations of the New England school of naturalists. < Proc. Ent. Soc. Phil., August-September, 1864, v. 3, pp. 207-249.

Discussion of statements, chiefly by Prof. L. Agassiz, upon questions in general entomology. The memoir is divided into sections; in the first, the distribution of insects in North America is discussed in opposition to the views of Agassiz; in the second section the Darwinian theory of the origin of species is discussed and some remarks on the variation of several species are added; in the third and fourth sections the statements of Prof. Agassiz regarding the worm-like larva stage of insects and the resemblances between the pupe of insects and the Crustacea are discussed and criticised; in the fifth section the author argues that the relative rank of the different orders of insects must be determined from a consideration of all the characters of each order and not from the significance of any one character; the sixth section is a review of Dana's classification of insects on the principle of cephalization; and in the seventh section several erroneous statements and generalizations in the same author's paper on classification are pointed out.

45. Walsh, B. D. On phytophagic varieties and phytophagic species. < Proc. Ent. Soc. Phil., November, 1864, v. 3, pp. 403-430.

Many species feed exclusively upon a single food-plant, while other species feed upon many kinds; correlated with this are certain larval or imaginal differences; when these different forms interbreed they are considered the same species and are termed phytophagic varieties; these when separated with a single kind of food-plant form phytophagic races, and these again by a continuation of their isolation form phytophagic species. Phytophagous forms are most abundant where the image is wingless. Diapheromera velii, Tingis [=Gargaphia] tiliæ, and T. [=G.] amorphæ are described as new; the following are mentioned in the remarks upon species and varieties: Haltica [=Disonycha] alternata, Chrysomela scalaris, Clytus [=Cyllene] robiniæ, C. [=C.] pictus, Dryocampa [=Sphingicampa] bicolor, Sphingicampa distigma [=bicolor], Bombyx [= Sericaria] mori, Halisidota tessellaris, H. caryæ, H. antiphola [=tessellaris], Cynips [=Amphibolips] q. spongifica, C. [=Andricus] q. punctata, C. [=A.] q. podagræ, and C. [=Amphibolips] q. inanis.

46. Walsh, B. D. On the insects, coleopterous, hymenopterous, and dipterous, inhabiting the galls of certain species of willow. Part 1st—Diptera. <Proc. Ent. Soc. Phil., December, 1864, v. 3, pp. 543-644.

Structural characters, habits, metamorphoses, etc., of *Cccidomyidae*; remarks on the unity of habits in genera; synopsis of cecidomyidous galls of *Salix*; descriptions of new species, their galls and inquilines; for a list of the new species, see the *Systematic Index*. See No. 197 for Part 2d.

47. Walsh, B. D. The borer. <Colman's Rural World. Reprint: <Prairie Farmer, 6 May, 1865, v. 15, p. 355.

Notice of soap as a means against borers.

48. Walsh, B.D. The new potato-bug and its natural history. <Pract. Ent., 30 October, 1865, v. 1, pp. 1-4.

Record of the spread eastwards of *Doryphora* 10-lineata; description of the egg; food-plants, enemies, and means against the same; comparative characters of *D. juncta* and *D.* 10-lineata; species of *Meloidæ* injurious to the potato.

49. [Walsh, B. D.] The joint-worm. < Pract. Ent., 27 November, 1865, v. 1, pp. 11, 12.

Reasons for disbelieving that the joint-worm is the larva of one of the *Chal-cidida*.

- 50. Walsh, B. D. On phytophagic varieties and phytophagic species, with remarks on the unity of coloration in insects. <Proc. Ent. Soc. Phil., November-December, 1865, v. 5, pp. 194-216, fig. See: <Amer. Journ. Sci., September, 1865, ser. 2, v. 40, pp. 282-284. <Ann. and Mag. Nat. Hist., November, 1865, ser. 3, v. 16, pp. 383, 384.
  - Argues for the origin of races and species by phytophagic isolation; refers to Datana ministra, D. contracta, Halisidota tessellaris, H. antiphola [= H. tessellaris], H. harrisii [= H. tessellaris], Arhopalus [= Cyllene] pictus, A. [= C.] robiniæ, A. ivfaustus [= C. decorus], Callidium antennatum, C. janthinum, Conotrachelus neuuphar, Doryphora 10-lineata, and D. juncta; unity of coloration explained by assumption of a genetic connection between various species; figure showing bullæ on wing of Ichneumon.
- 51. W[ALSH], B. D. [Cicada years.] < Pract. Ent., 25 December, 1865, v. 1, pp. 18-19.

Answer to inquiry of M. S. Hill; Cicada districts of the United States, as given by Fitch in N. Y. Rept. I, p. 39; habits of C. [= Tibicen] septendecim.

52. Walsh, B. D. Insects injurious to vegetation in Illinois. <Trans. Ill. State Agric. Soc., 1865, v. 5, pp. 469-483, figs.

Notes on injurious insects in Illinois in 1861; life-history and ravages of Leucania unipuncta.

- 53. Walsh, B. D. The "Thrips" of the vine-growers. What is it? <Pract. Ent., 25 December, 1865, v. 1, pp. 20-21.
  - The *Thrips* of fruit-growers probably not a true *Thrips*; food-habits of *Thrips*.
- 54. Walsh, B. D. The grub-worm. <Colman's Rural World, December, 1865. S.-b., No. 1, p. 51.

Habits, ravages, and means against Lachnosterna quercina [=fusca]; its larva compared with that of Ligyrus relictus; vernacular names of the Lachnosterna and of Allovhina nitida.

55. Walsh, B. D. Borers. < Pract. Ent., 29 January, 1866, v. 1, pp. 25-31, figs. 1-8.

Remarks on the name "borer;" figures, natural history, and means against Saperda bivittata [=candida], Chrysobothris femorata, Bostrichus [=Amphicerus] bicaudatus, Egeria [=Sannina] exitiosa, A. tipuliformis, Clytus [=Cyllene] robinia, C. [=C.] pictus, and Cerasphorus [=Chion] cinctus; need of State aid against injurious insects.

- 56. [Walsh, B. D.] [Attagenus? injuring feathers.] < Pract. Ent., 26 February, 1866, v. 1, p. 34.
  - Answer to inquiry of R. Parnell; ravages of and means against Dermestidæ.
- 57. [Walsh, B. D.] [Codling moth.] < Pract. Ent., 26 February, 1866, v. 1, p. 34.
  - Answer to inquiry of Isaac Hicks; natural history and means against Carpocapsa pomonella.
- 58. [Walsh, B. D.] [Aphididæ.] < Pract. Ent., 26 February, 1866, v. 1, p. 34.
  - Answer to inquiry of J. H. Foster, jr.; comparative characters of *Eriosoma* [= Schizoneura] lanigera and Pemphigus pyri [= Schizoneura lanigera].
- 59. [Walsh, B. D.] [Mites mistaken for plant-lice.] < Pract. Ent., 26 February, 1866, v. 1, p. 34.
  - Answer to inquiry of W. M. Smith; distinctive characters of Insecta and Arachnida; description and habitat of the eggs of Aphis mali.
- 60. [Walsh, B. D.] [Saddle-back caterpillar.] < Pract. Ent., 26 February, 1866, v. 1, p. 34.
  - Answer to inquiry of S. P. M.; description of the larva and image of *Empretia stimulca*; nrticating properties of the larva.
- 61. W[ALSH], B. D. [Red-humped prominent.] < Pract. Ent., 26 February, 1866, v. 1, p. 35.
  - Answer to inquiry of E. D. Wright; life-habits of Notodonta [= Œdemasia] concinna.
- **62.** Walsh, B. D. The joint-worm. < Pract. Ent., 26 February, 1866, v. 1, pp. 37-38.
  - Habitats of the larva of Cecidomyia destructor and of Eurytoma sp.; criticism of A. Fitch's report upon the latter.
- 63. W[ALSH, B. D.]. Entomology all a humbug. <Pract. Ent., 26 February, 1866, v. 1, p. 39.
  - Fewness of entomologists and the multiplicity of their duties the reason why so little has been effected against noxious insects.
- 64. W[ALSH], B. D. [Cocoons of Ichneumon-flies.] < Pract. Ent., 26 March, 1866, v. 1, p. 46.
  - Answer to inquiry of M. S. Hill; life-habits of the Microgasters.
- 65. W[ALSH], B. D. [Mass of eggs.] < Pract. Ent., 26 March, 1866, v. 1, p. 46.
  - Answer to inquiry of T. R. Payne; characters and life-habits of Orgyia leucostigma.
- 66. [Walsh, B. D.] [Apple-tree caterpillar; parasites.] < Pract. Ent., 26 March, 1866, v. 1, p. 46.
  - Answer to inquiries of G. E. Brackett; food-plants of Clisiocampa americana; characters and habits of Tachinida; habits of secondary parasites.
- 67. W[ALSH], B. D. Apple-tree borers. < Pract. Ent., 26 March, 1866, v. 1, p. 47.
  - Reprint, with remarks, of "Apple-tree borers" (Journ. of Commerce); extract from A. Fitch, of larval habits of Saperda bivittata [= candida].

- 68. Walsh, B. D. The white grub. <Pract. Ent., 30 April, 1866, v. 1, pp. 60-62.
  - Descriptions and habits of the larval states of Lachnosterna quercina [=fusca] and Ligyrus relictus; ravages and food-habits of the former; the hog as a white-grub destroyer.
- 69. Walsh, B. D. [Apple-tree scales.] < Pract. Ent., 30 April, 1866, v. 1, p. 64.
  - Answer to inquiry of L. S. Pennington; descriptions and ravages of *Mytilaspis* pomorum and Chionaspis furfurus; Coccinellidæ as a means against the former; petroleum as a remedy against bark-lice.
- 70. Walsh, B. D. [Clothes-moths.] < Pract. Ent., 30 April 1866, v. 1, p. 64.
  - Answer to inquiry of S. Canby; habits and means against Tineida.
- 71. Walsh, B. D. [Poplar borer.] < Pract. Ent., 30 April, 1866, v. 1, p. 64.
  - Answer to inquiry of P. C. Truman; larva and imago of Saperda calcarata infesting cottonwood.
- 72. Walsh, B. D. [Worms in flour and rye.] < Pract. Ent., 30 April, 1866, v. 1, p. 64.
  - Answer to inquiry of L. D. Hunt; descriptions and habits of *Tenebrio molitor* and *Dermestes lardarius*.
- 73. Walsh, B. D. Popular remedies for noxious insects. < Pract. Ent., 28 May, 1866, v. 1, pp. 71-74.
  - Criticism of various worthless remedies against injurious insects.
- 74. Walsh, B. D. [Serica iricolor Say.] < Pract. Ent., 28 May, 1866, v. 1, p. 77.
  - Answer to inquiry of B. F. Seibert; description, ravages, and habitat of Serica iricolor.
- 75. Walsh, B. D. [Measuring-worms.] < Pract. Ent., 28 May, 1866, v. 1, p. 77.
  - Answer to inquiry of T. Siveter; habits of Ennomos magnaria [=alniaria]; food-plants, habits, and means against E. [=Eudalimia] subsignaria and Anisopteryx [=Paleacrita] vernata.
- 76. Walsh, B. D. [Lygus pratensis.] < Pract. Ent., 25 May, 1866, v. 1, pp. 77-78.
  - Answer to inquiry of H. B. Howarth; habits and odors of Lygus pratensis; changes insects pass through.
- 77. Walsh, B. D. [Apple-tree insects.] < Pract. Ent., 28 May, 1866, v. 1, p. 78.
  - Answer to inquiry of C. Cooke; an unnamed tineid moth raised from cocoons off twigs of apple-tree; *Hemiteles* sp. and *Microgaster* sp. bred from cocoons attached to eggs of *Clisiocampa americana*.
- 78. Walsh, B.D. [Destructive current-worm.] < Pract. Ent., 28 May, 1866, y. 1, p. 78.
  - Answer to inquiry of W. M. Smith; cocoon and sexual characters of Nematus ribis [= ribesii].

79. Walsh, B. D. [Egg slits made by Homoptera.] < Pract. Ent., 28 May, 1866, v. 1, p. 78.

Answer to inquiry of C. Dadant; slits in pear-twigs caused by Chloroneura malefica [= Empoasca viridescens]; Proconia [= Oncometopia] undata oviposits in grape-vines.

- 80. Walsh, B. D. [Plant-lice.] < Pract. Ent., 28 May, 1866, v. 1, p. 78.
  - Answer to inquiry of J. Flournoy; characters, habits, encmies, and means against *Aphididæ*.
- 81. Walsh, B. D. [Insects injuring plum-trees.] < Pract. Ent., 28 May, 1866, v. 1, p. 78.
  - Answer to inquiry of A. C. Hammond; *Egeria* [=Sannina] exitiosa and an elaterid larva attacking plum-trees; the latter probably attracted by decayed matter, the work of the peach borer.
- 82. Walsh, B. D. Prof. Dana and his entomological speculations. < Proc. Ent. Soc. Phil., May-June, 1866, v. 6, pp. 116-121.

Rejoinder to J. D. Dana's reply to criticism upon the classification of insects.

- 83. Walsh, B. D. Clover-worms. < Pract. Ent., 25 June, 1866, v. 1, pp. 82-83.
  - Summary of published observations concerning Asopia costalis; points which need explanation; probable remedy.
- 84. WALSH, B. D. Click-beetles. < Pract. Ent., 25 June, 1866, v. 1, p. 83.
  - Note to W.'s "Click-beetles;" snapping of Elateride; Jaeger's Life of N. Am. Insects and Emmons' N. Y. Report unreliable.
- 85. Walsh, B. D. Cut-worms. < Pract. Ent., 25 June, 1866, v. 1, pp. 85-86.
  - Definition, food-habits, and means against cut-worms; climbing habits; cut-worms in California. See Nos. 229, 281.
- 86. Walsh, B.D. The canker-worm. Finding a mare's nest. < Pract. Ent., 25 June, 1866, v. 1, p. 87.
  - Criticism of communication in Western Rural; improbability of the report that Anisopteryx [= Paleacrita] vernata deposits her eggs on the ground.
- 87. Walsh, B. D. Driving nails into fruit trees. < Pract. Ent., 25 June, 1866, v. 1, pp. 87-88.
  - Uselessness of nails as a means against borers; extracts from various sources, with comments.
- 88. Walsh, B. D. The new potato-bug. <Pract. Ent., 25 June, 1866, v. 1, pp. 88-89.
  - Records Doryphora 10-lineata at Bloomington and Athens, Ill.; rate of its eastern progress; need of legislative action against injurious insects.
- 89. Walsh, B. D. [The painted borer.] < Pract. Ent., 25 June, 1866, v. 1, p. 89.
  - Answer to inquiry of T. C. Wright; sexual difference in the antenna of Clyves [= Cyllene] pictus bred from hickory,

90. Walsh, B. D. [Bug allied to the chinch-bug.] < Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of H. B. Howarth; comparative characters of Blissus leucopterus and an unnamed lygeid of similar habits.

91. Walsh, B. D. [Canker-worms.] < Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of C. H. W. Wood; means against Anisopteryx.

92. Walsh, B. D. [Apple-tree tineid.] < Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of C. Cooke; food-plant of Bucculatrix pomifoliella.

93. Walsh, B. D. [Spittle insect.] < Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of M. V. B. Hathaway; life-habits of species of Aphrophora.

94. Walsh, B. D. [Insects named.] < Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of E. Hall; occurrence of *Doryphora* 10-lineata at Athens, Ill.; *Hippodamia* [= Megilla] maculata devours the eggs of the same; two species of Cassida affect the sweet-potato.

95. Walsh, B. D. [Longicorn borers.] < Pract. Ent., 25 June, 1866, v. 1, p. 90.

Answer to inquiry of Dr. Trimble; food-habits of Orthosoma cylindricum, [= brunneum], Prionus laticollis, and P. imbricornis.

96. Walsh, B. D. [Canker-worms.] < Pract. Ent., 25 June, 1866, v. 1, p. 90.

Answer to inquiry of F. K. Phænix; scason of oviposition of Anisopteryx.

97. Walsh, B. D. [White-pine scale.] < Pract. Ent., 25 June, 1866, v. 1, p. 90.

Answer to inquiry of H. Shimer; Aspidiotus [= Chionaspis] pinifolii infesting Pinus strobus.

98. Walsh, B. D. Doctors differ. < Pract. Ent., 30 July, 1866, v. 1, p. 96.

Criticism of communications in agricultural papers; tanners' oil injurious to trees; sulphur plugged in trees does not protect the leaves; sheep in an orchard do not keep away Conotrachelus nenuphar.

99. Walsh, B. D. The grain plant-louse. < Pract. Ent., 30 July, 1866, v. 1, pp. 96-97.

The insect attacking small grains in Georgia is probably a plant-louse.

100. Walsh, B. D. Popular names for insects. < Pract. Ent., 30 July, 1866, v. 1, p. 97.

The use of the same vernacular name for different insects causes uncertainty in identifying and in suggesting means against injurious insects.

101. Walsh, B. D. Scientific names. < Pract. Ent., 30 July, 1866, v. 1, pp. 97-99.

Explains the necessity of using Latin for scientific names.

102. Walsh, B. D. [Grape-vine insects.] < Pract. Ent., 30 July, 1866, v. 1, pp. 99–100.

Answer to inquiry of C. S. Jackson; habits of an undescribed Fidia; injuries to vines by plant-lonse (Aphis vitis?); enemies of Aphidida.

103. Walsh, B. D. [Wire-worms.] < Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of A. D. Chesebro; summer fallowing as a means against wire-worms.

104. Walsh, B. D. [Bark-lice.] < Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of L. E. Harmon; life-history and means against Coccidæ.

105. Walsh, B. D. [Tortoise beetles.] < Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of C. K. Yant; food-plants and larval habits of Cassidida.

106. Walsh, B. D. [Grape bark-louse.] < Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of J. Bird; description and ravages of Lecanium [= Pulvinaria] vitis.

107. Walsh, B. D. [Plum bark-louse.] < Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of O. B. Douglas; description of Lecanium sp.

108. Walsh, B. D. [Saw-fly eggs.] < Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of L. D. Morse; position of saw-fly eggs on oak-leaf; characters of the larvæ of *Tenthredinidæ*.

109. Walsh, B. D. [Wheat midge.] < Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of R. F.; ravages, description, habits, and means against Cecidomyia [=Diplosis] tritici.

110. Walsh, B. D. [Wheat midge.] < Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of M. H. Boye; Cecidomyia [=Diplosis] tritici not infrequently passes from larval to imaginal state in the same season; means against the same.

111. Walsh, B. D. [Grape galls.] < Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of J. H. Foster, jr.; description of the galls and larvæ of \*Cecidomyidæ.

112. Walsh. B. D. [Apple-tree web-caterpillar.] < Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of Marion Hobart; description of the eggs of Clisiocampa americana; food-plants of the same and of Hyphantria textor [= cunea].

- 113. Walsh, B. D. [Grape-vine beetles.] < Pract. Ent., 30 July, 1866, v. 1, p. 101.
  - Answer to inquiry of M. S. Hill; food-habits of the larva and image of *Pelidnota punctata* and of *Anomala lucicola*.
- 114. Walsh, B. D. [Bot-flies.] < Pract. Ent., 30 July, 1866, v. 1, p. 102.
  - Answer to inquiry of J. B. Fisher; habits and hosts of several species of *Estrida*; parasite infesting *Triplax* [= *Tritoma*] thoracica. See No. 153.
- 115. Walsh, B. D. [Spruce-tree saw-flies.] < Pract. Ent., 30 July, 1866, v. 1, p. 102.
  - Answer to inquiry of J. Barratt; description of cocoon and imago of Lophyrus abietis; means against the same. See Pract. Ent., v. 1, p. 114.
- 116. Walsh, B. D. [Stings of insects.] < Pract. Ent., 30 July, 1866, v. 1, p. 102.
  - Answer to inquiry of A. O. Brickman; effects of the stings of bees and other insects.
- 117. Walsh, B. D. [Blackberry scale.] < Pract. Ent., 30 July, 1866, v. 1, p. 102.
  - Answer to inquiry of G. E. Brackett; characters of Lecanium sp. infesting blackberry.
- 118. Walsh, B. D. [Eggs in sumach.] < Pract. Ent., 30 July, 1866, v. 1, p. 102.
  - Answer to inquiry of W. M. Smith; eggs of Orchelimum sp.? or Xiphidium sp.? in pith of sumach.
- 119. W[ALSH], B. D. The "new potato-bug" in Maine. < Pract. Ent., 27 August, 1866, v. 1, p. 105.
  - Extract from Maine Farmer, 26 July, 1866, with comments; the larva of Lema trilineata mistaken for that of Doryphora 10-lineata.
- 120. Walsh, B. D. [The army-worm.] < Pract. Ent., 27 August, 1866, v. 1, p. 107.
  - Extract from Western Rural, 21 July, 1866, with comments; army-worm mistaken for canker-worm; need of precision in using popular names.
- 121. W[ALSH], B. D. [Fire-cure for potato-beetles.] < Pract. Ent., 27 August, 1866, v. 1, pp. 107–108.
  - Extract from letter from M. S. Hill, with comments; burning straw effective as a means against *Meloidæ* infesting potato-vines; its use against *Doryphora* 10-lineata; hot water as a means against the onion-maggot and peach-borer.
- 122. Walsh, B. D. A new humbug. < Pract. Ent., 27 August, 1866, v. 1, pp. 108-110.
  - Exposure of proposed remedy against Cecidomyia destructor; life-habits of the same.
- 123. W[ALSH], B. D. The striped bug. < Pract. Ent., 27 August, 1866, v. 1, p. 110, figs. 1, 2.
  - Extract from Western Rural, 21 July, 1866, with comments; characters, habits, means against, and figures of *Diabrotica vittata* and *D.* 12-punctata. See No. 148.

- 124. Walsh, B. D. [Grape-vine caterpillars.] < Pract. Ent., 27 August, 1866, v. 1, p. 111.
  - Answer to inquiry of B. Borden; description of the early stages of *Procris* [= Acoloithus] falsarius; characters and habits of the species of *Procris*.
- 125. Walsh, B. D. [Squash-vine insects.] < Pract. Ent., 27 August, 1866, v. 1, p. 111.
  - Answer to inquiry of J. Cope; description and habits of *Epilachna borealis*; habits of *Coccinellidæ*; description and means against the larva of *Trochilium cucurbitæ* [= *Melittia ceto*].
- 126. Walsh, B. D. [Injurious insects.] < Pract. Ent., 27 August, 1866, v. 1, p. 111.
  - Answer to inquiry of T. Conard; larval habits and means against Lema trilineata; work of the grain plant-louse (Nectarophora granaria) and of Trochilium cucurbita [= Melittia ceto]; mention of some of the enemies of bees.
- 127. Walsh, B. D. [Grape-leaf galls.] < Pract. Ent., 27 August, 1866, v. 1, pp. 111, 112.
  - Answer to inquiry of E. Daggy; description of the leaf-gall of *Phylloxera* vitifoliw [= vastatrix]; reasons for including it in the Coccide; dipterous enemy of the same. Sec No. 154.
- 128. Walsh, B. D. [Grape-vine insects.] < Pract. Ent., 27 August, 1866, v. 1, p. 112.
  - Answer to inquiry of W. H. S.; description and means against an undescribed gall on the tendrils and leaf-stalks of a grape-vine; life-habits of parasitic *Chalcidide*. See No. 160.
- 129. Walsh, B. D. [Grape-vine beetles.] < Pract. Ent., 27 August, 1866, v. 1, pp. 112, 113.
  - Answer to inquiry of W. J. Lawrence; food-habits of *Pelidnota punctata* and of *Colaspis flavida*.
- 130. Walsh, B. D. [Corydalis cornutus.] < Pract. Ent., 27 August, 1866, v. 1, p. 113.
  - Answer to inquiry of J. S. Lewis; natural history and habits of Corydalis cornutus.
- 131. Walsh, B. D. [Tobacco-moth.] < Pract. Ent., 27 August, 1866, v. 1, p. 113.
  - Answer to inquiry of F. W. Noble; transformations and food-plants of Sphinx [= Protoparce] carolina; food-plants of S. 5-maculata [= P. celeus].
- 132. Walsh, B. D. [Datana ministra.] < Pract. Ent., 27 August, 1866, v. 1, p. 113.
  - Answer to inquiry of S. S. Lacy; food-plants and transformations of *Datana* ministra.
- 133. Walsh, B. D. [Grape-vine and fuschia beetles.] < Pract. Ent., 27 August, 1866, v. 1, p. 113.
  - Answer to inquiry of F. K. Phœuix; Colaspis flavida injurious to grape-vine shoots; Haltica exapta [=carinata] destructive to fuschia; means against flea-beetles.

- 134. Walsh, B. D. [Blister-beetles.] < Pract. Ent., 27 August, 1866, v. 1, p. 113.
  - Answer to inquiry of J. Barber; food-plants of Lytta marginata [=Epicauta cinerea], L. [=E.] vittata, L. atrata [=E. pennsylvanica], and L. cinerea [=Macrobasis unicolor].
- 135. Walsh, B. D. [Colaspis flavida; Lema trilineata.] < Pract. Ent., 27 August, 1866, v. 1, p. 114.
  - Answer to inquiry of J. F. Beuner; Colaspis flavida destructive to grape-vines; distribution and method of breeding Lema trilineata.
- 136. Walsh, B. D. [Green worms on gooseberries and currants; *Lema trilineata.*] < Pract. Ent., 27 August, 1866, v. 1, p. 114.
  - Answer to inquiry of H. Burt; gooseberries and currants injured by larva of a saw-fly?; effects of excessive rain, heat, and drought; food-plants of Lema trilineata.
- 137. Walsh, B. D. [Galls.] < Pract. Ent., 27 August, 1866, v. 1, p. 114.
  - Auswer to inquiry of H. Shimer; note of galls made by Rhodites radicum, Trypeta solidaginis, and Thelaxes [=Colopha] ulmicola.
- 138. Walsh, B. D. [Potato and corn insects.] < Pract. Ent., 27 August, 1866, v. 1, p. 114.
  - Answer to inquiry of T. H. Parsous; scarcity of Lema trilineata in Illinois; Doryphora 10-lineata destroyed by turkeys, but not by fowls; Gortyna sp.? injurious to young Indian corn; rules for breeding insects.
- 139. Walsh, B. D. [Cocoons on apple-trees.] < Pract. Ent., 27 August, 1866, v. 1, p. 114.
  - Answer to inquiry of M. S. Hill; description of cocoon and image of Attacus cecropia; the interaction of organisms.
- 140. Walsh, B. D. Imported insects; the gooseberry saw-fly. <Pract. Ent., 29 September, 1866, v. 1, pp. 117-125, fig.</pre>
  - List of some injurious European insects imported into America and of American insects imported into Europe; reasons for the increase and abundance of noxious European insects in America, and why American species do not flourish in Europe; natural history, description, and means against Nematus ventricosus [=ribesii]; figure of currant-leaf, showing method of deposition of eggs and work of larva; natural history and description of larva and imago of Pristiphora grossulariæ n. sp.; number of saw-flies infesting the gooseberry and currant in Europe.
- 141. Walsh, B. D. [Borers.] < Pract. Ent., 29 September, 1866, v. 1, p. 126.
  - Answer to inquiry of W. H. R. Lykins; western distribution of Clytus [=Cyllene] robinia.
- 142. Walsh, B. D. [Wheat midge.] < Pract. Ent., 29 September, 1866, v. 1, p. 126.
  - Answer to inquiry of C. P. Wickersham; destructiveness of Cecidomyia [=Diplosis] tritici; nature of its cocoon.

143. Walsh, B. D. [Crickets.] < Pract. Ent., 29 September, 1866, v. 1, p. 126.

Answer to inquiry of Marion Hobart; characters and food-habits of Acheta [= Gryllus] abbreviatus; katydids not exclusively vegetarians; Œcanthus niveus found feeding on plant-lice.

- 144. Walsh, B. D. [Walking-stick.] < Pract. Ent., 29 September, 1866, v. 1, p. 126.
  - Answer to inquiry of L. W. Taylor; characters and habits of Spectrum [= Diapheromera] femorata.
- 145. Walsh, B. D. [Apple-tree insects.] < Pract. Ent., 29 September, 1866, v. 1, p. 126.
  - Answer to inquiry of H. B. Beegle; characters and food-plants of *Limenitis* ursula; description and food-plants of the larva of *Lagoa opercularis*; characters of the imago.
- 146. Walsh, B. D. [Mites on grasshoppers.] < Pract. Ent., 29 September, 1866, v. 1, p. 126.

Answer to inquiry of W. Riddell; Astoma [= Trombidium] locustarum infesting Caloptenus femur-rubrum.

- 147. W[ALSH], B. D. Grasshoppers and locusts. <Pract. Ent., October, 1866, v. 2, pp. 1-5, 22.
  - Description, migration, and ravages of *Caloptenus spretus*; limits of its range and means of preventing its increase; confusion caused by the use of popular names of insects. On p. 22 a "note," accidentally omitted, gives the comparative length of the wing-covers and antennæ of *Caloptenus spretus* and *C. femur-rubrum*.
- 148. W[ALSH], B. D. The striped cucumber-bug. <Pract. Ent., October, 1866, v. 2, p. 5.

Diabrotica vittata attacks German asters. See No. 123.

- 149. W[ALSH], B. D. Fire-blight. < Pract. Ent., October, 1866, v. 2, p. 7.
  - Extract from Horticulturist, with comments; cause of fire-blight unknown; not produced by Scolytus [= Xyleborus] pyri.
- 150. W[ALSH], B. D. The Hessian fly. < Pract. Ent., October, 1866, v. 2, p. 7.
  - Extract from Colman's Rural World, with comments; late sowing as a means against Cecidomyia destructor.
- 151. [Walsh, B. D.] [Injurious caterpillars; plant-lice enemies.] < Pract. Ent., October, 1866, v. 2, pp. 7-8.
  - Answer to inquiry of T. McGraw; habits, descriptions, and food-plants of larva of Dryocampa senatoria and of Datana ministra; food-habits of larva allied to D. ministra; description and habits of larva of Scymnus sp.; S. hamorrhous? bred from gall of Thelaxes [=Colopha] ulmicola.
- 152. [Walsh, B. D.] [Tomato-worm.] < Pract. Ent., October, 1866, v. 2, p. 8.
  - Answer to inquiry of A. A. Jackson; description of the larva and pupa of *Protoparce celeus*; food-plants and harmlessness of the larva.

- 153. [Walsh, B. D.] [Dipterous larva on swallows.] < Pract. Ent., October, 1866, v. 2, p. 8.
  - Answer to inquiry of J. B. Fisher; larvæ found on swallows (see No. 114) belong to the *Muscidæ* and not to the *Estridæ*; extract from letter of Osten Sacken on larval habits of *Muscidæ* found with birds.
- 154. [Walsh, B. D.] [Bark-louse enemy.] < Pract. Ent., October, 1866, v. 2, p. 8.
  - Answer to inquiry of E. Daggy; see No. 127; according to Osten Sacken the bark-louse enemy belongs to *Leucopis*; systematic position of the genus.
- 155. [Walsh, B. D.] [Parasitized tomato-worm.] < Pract. Ent., October, 1866, v. 2, pp. 8-9.
  - Answer to inquiry of T. C. Wright; habits of *Microgaster*, parasitic on *Protoparce celeus*; habits of ichneumonized larvæ.
- 156. [Walsh, B. D.] [Beetles on buttercup and azalea.] < Pract. Ent., October, 1866, v. 2, p. 9.
  - Answer to inquiry of C. H. Peck; identification of Galeruca [=Adimonia] rufosanguinea, found on Ranunculus acris, and of Prasocuris varipes on Azalea. nudiflora; synoptic table, by J. L. Leconte, of the species of Prasocuris.
- 157. [WALSH, B. D.] [Flying-bug.] < Pract. Ent., October, 1866, v. 2, p. 9.
  - Answer to inquiry of E. E. Sheldon; Aphodius mistaken for Cecidomyia destructor.
- 158. [WALSH, B. D.] [Parasitic cocoon.] < Pract. Ent., October, 1866, v. 2, p. 9.
  - Answer to inquiry of H. W. Howarth; description of cocoons made by *Microgaster* and *Pezomachus*; habits of *Ichneumonidæ*.
- 159. [Walsh, B. D.] [Oak-bark louse.] < Pract. Ent., October, 1866, v. 2, p. 9.
  - Answer to inquiry of T. Meehan; undetermined Coccus on red-oak.
- 160. [Walsh, B. D.] [Grape-galls.] < Pract. Ent., October, 1866, v. 2, p. 9.
  - Answer to inquiry of W. H. S.; see No. 128; larva of *Leucopis* sp., an enemy to grape-vine gall-louse; probable identity of the maker of the tendril and leaf-galls; varieties of grape infested by *Phylloxera vastatrix*.
- 161. [Walsh, B. D.] ["Saddle-back."] < Pract. Ent., October, 1866, v. 2, p. 9.
  - Answer to inquiry of T. M. Harvey; food-plants, description, and urticating properties of *Empretia stimulea*.
- 162. [Walsh, B. D.] [Corn-worm.] < Pract. Ent., October, 1866, v. 2, p. 9.
  - Answer to inquiry of J. B. Ellis; method of work of two lepidopterous larvæ.
- 163. [Walsh, B. D.] [Insects named.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answe to inquiry of W. C. Fish; comparative characters of *Entilia sinuata* and E, f = Publilia concava.

- 164. [Walsh, B. D.] [Grape insects.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answer to inquiry of J. H. Garman; description and habits of larva of Procris [= Harrisina] americana; Proconia [= Oncometopia] undata and several species of Erythroneura [= Typhlocyba] as grape enemies.
- 165. [Walsh, B. D.] [Datana ministra.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answer to inquiry of J. B.; increase of injuries caused by *Datana ministra*; distinctive characters of the larve of *Geometrida*.
- 166. [Walsh, B. D.] [Iulus marginatus.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answer to inquiry of T. Wiggins; characters and food of *Inlus* [= Spirobolus] marginatus.
- 167. [WALSH, B. D.] [Midge.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answer to inquiry of W. G. Morris; characters and habits of the larva and imago of *Chironomus* sp.
- 168. [Walsh, B. D.] [Rat-tailed larva.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answer to inquiry of J. A. Lapham; characters and habitats of the larvæ of rat-tailed Syrphidæ.
- 169. [Walsh, B. D.] [Beetle on thistle.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answer to inquiry of W. S. Robertson; characters and food-plants of *Phyllobrotica* [= *Diabrotica*] *longicornis*.
- 170. [WALSH, B. D.] [Grape-vine Aphis.] < Pract. Ent., October, 1866, v. 2, p. 10.
  - Answer to inquiry of H.; grape-vine injured by Aphis vitis.
- 171. W[ALSH], B. D. The new potato-bug. <Pract. Ent., November, 1866, v. 2, pp. 13-16, fig.
  - Eastern progress of *Doryphora* 10-lineata; rate of travel; hand-picking the only effective remedy; description of a horse machine for their destruction; pecuniary loss inflicted by the species.
- 172. W[ALSH], B. D. The canker-worm < Pract. Eut., November, 1866, v. 2, p. 16.
  - Tarring trees effective against Paleacrita vernata.
- 173. W[ALSH], B. D. The canker-worm again. < Pract. Ent., November, 1866, v. 2, pp. 16-17.
  - Critical review of article in New England Farmer; value of tarring as a means against Paleacrita vernata.
- 174. Walsh, B. D. Notes by Benj. D. Walsh. < Pract. Ent., November, 1866, v. 2, pp. 19-20.
  - Remarks on statement of H. Shimer in his paper, "The grape leaf gall-coccus" (Pract. Ent., pp. 17-19); number of eggs to each Q; tendril and leaf-galls probably produced by the same insect; old leaves entirely free from bark-lice by the end of summer; characters of the pupa of Leucopis; systematic position and food-habits of Thysanoptera; criticism of paper by H. Shimer in Prairie Farmer, 3 November, 1861.

175. W[ALSH], B. D. The striped bug. <Pract. Ent., November, 1866, v. 2, p. 20.

Remarks on note by A.; effects of plaster as a means against Diabrotica vittata.

- 176. [Walsh, B. D.] [Currant insects; *Psocus venosus.*] < Pract. Ent., November, 1866, v. 2, p. 20.
  - Answer to inquiry of I. Hicks; occurrence of *Pristiphora grossulariæ* in the Eastern States; *Ellopia* [= *Eufitchia*] *ribearia* injurious to currant; date of introduction of "sulphur-cure" on peach-trees; characters and habits of *Psocus venosus*.
- 177. [WALSH, B. D.] [Worm in apple.] < Pract. Ent., November, 1866, v. 2, pp. 20-21.

Answer to inquiry of C. Ward; description and ravages of larva of Trypeta pomonella?

- 178. [Walsh, B. D.] [Insects attracted to light.] <Pract. Ent., November, 1866, v. 2, p. 21.
  - Answer to inquiry of Practical Pomologist; conditions favorable for attracting insects to light; kinds most frequently attracted; the proportion of injurious species attracted.
- 179. [Walsh, B. D.] [Zebra caterpillar.] <Pract. Ent., November, 1866, v. 2, p. 21.

Answer to inquiry of J. H. Parsons; description of the larva of *Mamestra picta*; times of transformation.

- 180. [Walsh, B. D.] [Inquiries answered.] < Pract. Ent., November, 1866, v. 2, p. 21.
  - Answer to inquiry of J. Pettit; identification of several beetles; galls on golden-rod made by Euryptychia saligneana and Trypeta solidaginis; characters of short-winged form of Micropus [=Blissus] leucopterus; its occurrence in Canada.
- 181. [WALSH, B. D.] [Worm in corn.] < Pract. Ent., November, 1866, v. 2, pp. 21-22.

Answer to inquiry of J. B. Ellis; description of larva, habits, transformations, and means against an undetermined noctuid.

- 182. [Walsh, B. D.] [Bag-worms.] < Pract. Ent., November, 1866, v. 2, p. 22.
  - Answer to inquiry of C. P. Wickersham; characters and synonymy of Thyridopteryx ephemeræformis.
- 183. [WALSH, B. D.] [Ichneumon cocoons.] < Pract. Ent., November, 1866, v. 2, p. 22.

Answer to inquiry of S. A. N.; characters of cocoons of Microgaster sp.?

184. Walsh, B. D. Note. < Proc. Ent. Soc. Phil., December, 1866, v. 5, p. 260.

Withdraws assertion attributed to C. R. Osten Sacken.

- 185. W[ALSH], B. D. The old-fashioned potato-bugs. <Pract. Ent., December, 1866, v. 2, pp. 25-27, figs.
  - Natural history and means against Lema trilineata, Lytta [= Epicauta] vittata, L. atrata [= E. pennsylvanica], L. marginata [= E. cinerea], and L. cinerea [=Macrobasis unicolor]; figures L. trilineata and E. vittata.

- 186. W[ALSH], B. D. Klippart's wheat plant. < Pract. Ent., December, 1866, v. 2, pp. 27-29.
  - Adverse criticism of the entomological portion of the above-named book.
- 187. W[ALSH], B. D. Trimble's insect enemies of fruit and fruit trees. <a href="#">< Pract. Ent.</a>, December, 1866, v. 2, pp. 29–30.

Favorable review of the above-named book.

- 188. W[ALSH], B. D. Answer to the above, by B. D. W. < Pract. Ent., December, 1866, v. 2, pp. 31-33, figs.
  - Answers to questions asked in J. S. Houghton's "Insects in the Orchard" (Pract. Ent., pp. 30-31); food-habits and hibernation of Conotrachelus nenuphar; comparative characters and figures of Aspidiotus conchiformis [=Mytilaspis pomorum] and Coccus harrisii [=Chionaspis furfurus]; natural history of C. harrisii; means against and enemies of the two species; figures Chilocorus bivulnerus and Hippodamia [=Megilla] maculata; food-habits and synonymy of Lytta [=Pomphopæa] sayi; flowing as a means against root-feeding insects; inefficacy of salt, lime, ashes, etc., against the same; insects attacking evergreens not likely to injure fruit trees; cannibal habits of spiders; habits of bees and wasps.
- 189. [Walsh, B. D.] [Cicada; gooseberry-worm.] < Pract. Ent., December, 1866, v. 2, p. 33.
  - Answer to inquiry of M. S. Hill; Cicada [= Tibicen] septendecim compared with an undescribed species; ravages of Pristiphora grossulariæ? on gooseberry bushes.
- 190. [Walsh, B. D.] [Vespidæ.] < Pract. Ent., December, 1866, v. 2, pp. 33, 34.

Answer to inquiry of M. Hobart; life-habits of Vespidæ.

- 191. [Walsh, B. D.] [Meal-worms: Timber-borers.] < Pract. Ent., December, 1866, v. 2, p. 34.
  - Answer to inquiry of M. C. D.; characters, food-habits, and means against *Tenebrio molitor* and *T. obscurus*; characters of *Ptinus brunneus* infesting pine timber; corrosive sublimate as a means against timber insects.
- 192. [Walsh, B. D.] [Corn-worm.] < Pract. Ent., December, 1866, v. 2, p. 34.
  - Answer to J. B. Ellis; number of broods of Heliothis armigera in the Northern and Southern States.
- 193. [Walsh, B.D.] [Thousand-legged worms.] < Pract. Ent., December, 1866, v. 2, pp. 34-35, fig.
  - Answer to inquiry of G. W. Robinson; description and figure of *Iulus multi-striatus* n. sp. [= Cambala annulata]; habits and means against the same.
- 194. [Walsh, B. D.] [Cranberry-galls, etc.] < Pract. Ent., December, 1866, v. 2, p. 35.
  - Answer to inquiry of W. C. Fish; occurrence of galls made by Cecidomyia sp. on leaves of cranberry; identification of several insects.
- 195. [Walsh, B. D.] Another humbug. <Pract. Ent., December, 1866, v. 2, p. 35.
  - Extract, with comments, from Cultivator and Country Gentleman, 22 November, 1866, exposing worthlessness of P. B. Sheldon's composition for destroying borers,

- 196. [Walsh, B. D.] Notices. < Pract. Ent., December, 1866, v. 2, p. 35.
  - Mention of several agricultural journals.
- 197. Walsh, B. D. On the insects, coleopterous, hymenopterous, and dipterous, inhabiting the galls of certain species of willow. Part 2d and last. <Proc. Ent. Soc. Phil., Décember, 1866–January, 1867, v. 6, pp. 223–288.
  - See No. 46 for Part 1st. Supplementary notes on the Cecidomyidæ (gall-makers and guest-flies); criticism of statements of Fitch and Harris; discussion of structure and habits of Tenthredinidæ and insects generally; synopsis of tenthredinidous willow-galls; descriptions of the galls, their makers and inquilines; for the new species described, see the Systematic Index; remarks on species and varieties; figures fore-wings of Tenthredo and Ichneumon.
- 198. W[ALSH], B. D. Plant-lice—their friends and enemies. < Pract. Ent., January, 1867, v. 2, pp. 37-44, figs.
  - Method of work and mode of reproduction of Aphididæ; their relations to ants; plant-lice enemies; figures Aphis mali and several enemies of plant-lice; means against Aphididæ.
- 199. W[ALSH], B. D. Birds *versus* insects. < Pract. Ent., January, 1867, v. 2, pp. 44-47.
  - Insectivorous birds not necessarily beneficial; a bird must be shown to eat at least thirty (30) times as many injurious insects as it does beneficial ones before it can be considered useful.
- 200. [Walsh, B. D.] [Insects named.] < Pract. Ent., January, 1867, v. 2, p. 47.
  - Answer to inquiry of J. Pettit; identification of many species, mostly beetles; characters and food-habits of Clerus nigripes [=4-guttatus]; habitat of Leptura capitata and Tingis [=Corythuca] ciliata.
- 201. [Walsh, B. D.] [Apple-tree insects.] < Pract. Ent., January, 1867, v. 2, p. 47.
  - Answer to inquiry of M. Hobart; increasing distribution of Aspidiotus conchiformis [= Mytilaspis pomorum]; enemies of the same; characters of the eggs of Aphis mali.
- 202. [Walsh, B. D.] [Work in entomology.] < Pract. Ent., January, 1867, v. 2, p. 47.
  - Answer to G. Scarborough; advice for the study of entomology by beginners.
- 203. W[ALSH], B. D. The true *Thrips* and the bogus *Thrips*. < Pract. Ent., February, 1867, v. 2, pp. 49-52, figs.
  - Natural history, characters, habits, and figures of *Thrips* sp.; characters of the larva and image of *Haltica chalybea*; figure of image; habits of species of *Erythroneura* [= *Typhlocyba*]; description and figures of *E*. [= *T*.] vitis.
- 204. W[ALSH], B. D. Universal remedies. < Pract. Ent., 1867, v. 2, p. 52.
  - Exposure of proposed universal remedy against fruit-tree insects.
- 205. W[ALSH], B. D. Poisoning noxious insects. <Pract. Ent., February, 1867, v. 2, pp. 52-53.

Sugaring with poison as a means against Noctuida.

- 206. W[ALSH], B. D. Remarks by B. D. W. < Pract. Ent., February, 1867, v. 2, p. 54.
  - Comments on S. S. Rathvon's "Bag-worms" (Pract. Ent., pp. 53-54); distribution and food-plants of Thyridopteryx ephemeræformis.
- 207. W[ALSH], B. D. Habits of the tree-cricket (*Ecanthus niveus*). <Pract. Ent., February, 1867, v. 2, p. 54, figs.
  - Characters of eggs and method of deposition; characters, food-habits, and figures of the imago.
- 208. [Walsh, B. D.] Importing European parasites. <Pract. Ent., February, 1867, v. 2, pp. 54-55.
  - Imaginary correspondence between Asa Fitch and John Curtis on the importation of parasitic insects.
- 209. [Walsh, B. D.] [Screw-worm.] < Pract. Ent., February, 1867, v. 2, p. 55.
  - Answer to inquiry of L. D. Morse; nndetermined larva found in osage-orange seed; hominivorous habits of *Lucilia macellaria*.
- 210. [Walsh, B. D.] [Attacus cecropia.] < Pract. Ent., February, 1867, v. 2, p. 55.
  - Answer to inquiry of T. T. Smith; characters of larva and image of Attacus cecropia; food-plants; method of issnance from cocoon; nature of fluid discharged when emerging from cocoon.
- 211. [WALSH, B. D.] [Apple-worm.] < Pract. Ent., February, 1867, v. 2, pp. 55-56.
  - Answer to inquiry of W. C. Fish; characters of the pupa of Sciara mali.
- 212. [Walsh, B. D.] [Oak-gall.] < Pract. Ent., February, 1867, v. 2, p. 56.
  - Answer to inquiry of W. Mnir; characters of an undetermined cynipid gall on oak.
- 213. [Walsh, B. D.] [Cicada: Grape-vine Procris.] < Pract. Ent., February, 1867, v. 2, p. 56.
  - Answer to inquiry of M. S. Hill; variations in the image of Cicada [= Tibicen] septendecim and in the song of the same; characters of the larva of Procris [= Harrisina] americana.
- 214. [Walsh, B. D.] [*Nitidulidæ*.] < Pract. Ent., February, 1867, v. 2, p. 56.
  - Answer to inquiry of W. H. S.; food-habits of Ips fasciatus and Nitidula bipustulata.
- 215. [Walsh, B. D.] [Turnip enemy.] < Pract. Ent., February, 1867, v. 2, p. 56.
  - Answer to inquiry of F. T. Pember; characters and food-habits of *Polydes-mus complanatus*.
- 216. [WALSH, B. D.] [Wheat midge.] < Pract. Ent., February, 1867, v. 2, p. 57.
  - Answer to inquiry of C. P. Wickersham; nature of the membrane enveloping the full-grown larva of *Diplosis tritiei*.

217. [Walsh, B. D.] [Queries answered.] < Pract. Ent., February, 1867, v. 2, p. 57.

Answer to inquiry of R. Middleton; toads, frogs, and spiders beneficial; effects of the stings of various insects.

- 218. [Walsh, B. D.] [Scales.] < Pract. Ent., February, 1867, v. 2, p. 57.
  - Answer to inquiry of M. M. S.; characters and ravages of scales on oleander and orange; means against *Coccida*.
- 219. [Walsh, B.D.] [Hundred-legged worm.] < Pract. Ent., February, 1867, v. 2, p. 57.
  - Answer to inquiry of S. P. Monks; identification of *Polydesmus virginiensis*; distinctive characters of Myriapoda.
- 220. [Walsh, B. D.] [Bark-borers.] < Pract. Ent., February, 1867, v. 2, pp. 57-58.
  - Answer to inquiry of C. V. Riley; synoptic table and food-habits of several species of *Scolytus*; descriptions of *S. fagi* n. sp. and *S. caryæ* n. sp. [=4-spinosus].
- 221. [Walsh, B. D.] [Aleurodes.] < Pract. Ent., February, 1867, v. 2, p. 58.
  - Answer to inquiry of D. F. C.; characters and food-plants of an undescribed species of *Aleurodes*.
- 222. W[ALSH], B. D. The critic criticized. <Pract. Ent., February, 1867, v. 2, p. 58. Answer [by C. V. Riley]. <Prairie Farmer, 16 March, 1867, [v. 35], n. s., v. 19, p. 169. S.-b., No. 2, p. 58. Criticism of article by C. V. Riley (Prairie Farmer, 19 January, 1867, [v. 35], n. s., v. 19, p. 37).
- 223. [Walsh, B. D.] Obituary. \*<Pract. Ent., February, 1867, v. 2, p. 58.

Notice of the late Brackenridge Clemens.

- 224. W[ALSH], B. D. Wire-worms. <Pract. Ent., March, 1867, v. 2, pp. 61-62, figs.
  - Characters of Myriapoda and larvæ of *Elateridæ*, popularly called wire-worms; food-habits of larva of *Ludius attenuatus*; figure of larva and imago of the same; confusion caused by the use of the term "wire-worms" by correspondents of the Country Gentleman.
- 225. W[ALSH], B. D. Imported insects.—The onion-fly. <Pract. Ent., March, 1867, v. 2, p. 64, figs.
  - Figures of larva and imago of Anthomyia ceparum and of Ortalis [= Tritoxa] flexa; comparative characters of imagos; distribution and means against the two species.
- 226. W[ALSH], B. D. [Means against cut-worms.] < Pract. Ent., March, 1867, v. 2, p. 66.
  - Recommends, in reply to J. Townley's inquiry, sugaring with poisoned molasses as a means against cut-worms.

- 227. W[ALSH], B. D. Entomology indeed run mad. <Pract. Ent., March, 1867, v. 2, pp. 66, 67.
  - Reprint of "The bud-worm" (N. C. Rural Journ., September, 1866), with criticism and correction of some of the errors.
- 228. W[ALSH], B. D. The imported gooseberry saw-fly. < Pract. Ent., March, 1867, v. 2, p. 67.
  - Reason for re-appearance in June and for the non-appearance of the second broad of Nematus ventricosus [=ribesii] in New York in 1866.
- 229. W[ALSH], B. D. Tree cut-worms. <Pract. Ent., March, 1867, v. 2, p. 67.
  - Cut-worm described (Pract. Ent., v. 1, pp. 85-86) identified as *Hadena chenopodii* [= Mamestra trifoli]. See Nos. 85, 281.
- 230. W[Alsh], B. D. Doctoring fruit trees again. <Pract. Ent., March, 1867, v. 2, pp. 67, 68.
  - Extract from Industrial Gazette, 15 December, 1866, with criticism; calomel, sulphur, and substances insoluble in water not absorbed into the circulation of trees.
- 231. W[ALSH,] B. D. The grape-vine Colaspis (Colaspis flavida Say). <Pract. Ent., March, 1867, v. 2, pp. 68-69, fig.
  - Ravages of *Colaspis flavida*; comparison with allied species; remarks on the law of priority and on certain insects becoming suddenly injurious; figures *C. flavida*.
- 232. W[ALSH], B. D. Another universal remedy. <Pract. Ent., March, 1867, v. 2, p. 69.
  - Extract from reprint (?) in Cultivator and Country Gentleman, 10 January, 1867, with criticism of proposed remedy against insects injurious to trees.
- 233. W[ALSH], B. D. Borers. The plug-ugly theory. <Pract. Ent., March, 1867, v. 2, p. 69.
  - Criticism of theory that a plug driven into a hole in a tree is death to borers.
- 234. W[ALSH], B. D. A mass of mistakes. < Pract. Ent., March, 1867, v. 2, p. 70.
  - Correction of errors in "Remedy for the borer" (Prairie Farmer, 9 February, 1867).
- 235. W[ALSH], B. D. Hop-growing in the West. <Pract.Ent., March, 1867, v. 2, p. 70.
  - Extract from Country Gentleman, 31 January, 1867, showing ravages of *Phorodon humuli* in Vermout; dauger of its introduction into the Western States.
- 236. W[ALSH], B. D. Thousand-legged worms. < Pract. Ent., March, 1867, v. 2, p. 70.
  - Extract from letter of J. H. Parsons, with comments; injuries to onions by Iulus multistriatus [= Cambala annulata]; I. multistriatus undistinguishable from I. cæruleo-cinctus.

237. W[ALSH], B. D. Fighting the Curculio. <Pract. Ent., March, 1867, v. 2, p. 71.

Extract from Genesee Farmer for 1853, p. 125; ridicule of additions to "jarring" as a means against Conotrachelus nenuphar.

238. W[ALSH], B. D. ["Bushels of butterflies."] < Pract. Ent., March, 1867, v. 2, p. 71.

Extract from Cincinnati Gazette, August, 1866, with comments; occurrence of dead images of Attacus cecropia? in large numbers ("10 bushels") in Newport, Ohio; food-plants of the larva.

239. [Walsh, B. D.] [Seab on potato.] < Pract. Ent., March, 1867, v. ; 2, pp. 71-72.

Answer to inquiry of T. L. J. Baldwin; account of blister-like scabs on potatoes, probably caused by Sciara sp.; means against the same.

240. [Walsh, B. D.] [Mass of eggs.] < Pract. Ent., March, 1867, v. 2, p. 72.

Answer to inquiry of E. Daggy; egg-masses of Clisiocampa americana; food-plants of C. americana and C. sylvatica [=disstria].

241. [Walsh, B. D.] [Food of katydids.] < Pract. Ent., March, 1867, v. 2, p. 72.

Answer to inquiry of C. M.; food of Microcentrum retinervis largely carnivorous.

242. [Walsh, B. D.] [Caterpillar nest on wild cherry.] < Pract. Ent. March, 1867, v. 2, p. 72.

Answer to inquiry of H. Morey; undetermined larva on wild cherry, foodplants of Hyphantria textor [=eunea].

243. [Walsh, B. D.] [Insect eggs.] < Pract. Ent., March, 1867, v. 2, p. 72.

Answer to inquiry of P. Ferris; undetermined eggs of Lepidoptera and Hemiptera on apple-tree twigs.

244. [Walsh, B. D.] [Attacus polyphemus, etc.] < Pract. Ent., March, 1867, v. 2, pp. 72-73.

Answer to inquiry of M. M. S.; variations in Attacus [= Telea] polyphemus; habits and times of transformations of Arctia [= Pyrrharctia] isabella; references to history of Dryocampa rubicunda.

245. [Walsh, B. D.] [Cossus robiniæ, etc.] < Pract. Ent., March, 1867, v. 2, p. 73.

Answer to inquiry of J. Townley; food-habits and injuries of Cossus robiniæ; result of freezing insects; characters of some wood-borers.

246. [Walsh, B. D.] [Museum pests.] < Pract. Ent., March, 1867, v. 2, p. 73.

Answer to inquiry of F. L. Van Arsdale; means against Dermestide.

247. [Walsh, B. D.] [Katydid eggs.] < Pract. Ent., March, 1867, v. 2, p. 73.

Answer to C. M. B.; characters of eggs of Microcentrum retinervis.

248. [Walsh, B. D.] [Squash-vine borer.] < Pract. Ent., March, 1867, v. 2, p. 73.

Answer to inquiry of E. Nason; ravages and means against Trochilium cucurbita [= Melittia ceto].

- 249. [Walsh, B. D.] [Apple-twig borers, etc.] < Pract. Ent., March, 1867, v. 2, pp. 73-74.
  - Answer to inquiry of A. W. Brumbaugh; work of Bostrichus [= Amphicerus] bicaudatus; characters and habits of Taniopteryx fasciata; ravages, habits, and means against Macrodaetylus subspinosus.
- 250. [Walsh, B. D.] [Hessian fly.] < Pract. Ent., March, 1867, v. 2, p. 74.

Answer to inquiry of E. E. Sheldon; hibernation of the larva of Cecidomyia destructor.

251. [Walsh, B. D.] [Tree-cricket.] < Pract. Ent., March, 1867, v. 2, p. 74.

Answer to inquiry of J. M. Cole; food-habits of *Œcanthus niveus*; characters of its eggs.

252. [Walsh, B. D.] [Tineids in bee-hives.] < Pract. Ent., March, 1867, v. 2, p. 74.

Answer to inquiry of J. H. Hunt; characters of case and larva of undetermined tineid.

253. W[ALSH], B. D. Jumping to conclusions. <Pract. Ent., March, 1867, v. 2, p. 74.

Criticism of article "The potato-bug" (Wisconsin Farmer, 2 March, 1867).

- 254. W[ALSH], B. D. The common Curculio and its allies. <Pract. Ent., April, 1867, v. 2, pp. 75-81.
  - Characters of the Rhyncophora; characters, ravages, life-history, food-habits, number of broods, and means against Conotrachelus nenuphar; ravages, habits, characters, and means against Anthonomus prunicida [= Coccotorus scutellaris] and A. 4-gibbus; mention of additional injurious weevils; comparative characters of the three species.
- 255. W[ALSH], B. D. Remarks by B. D. W. < Pract. Ent., April, 1867, v. 2, p. 82.

Comments on C. V. Riley's article, "The imported apple-tree bark-louse" (Prairie Farmer, 23 March, 1867, [v. 35], n. s., v. 19, p. 184).

256. W[ALSH], B. D. Confessing the corn. < Pract. Ent., April, 1867, v. 2, p. 82.

Acknowledgment of mistake in quoting from Prairie Farmer.

257. [Walsh, B. D.] [Bibio albipennis.] < Pract. Ent., April, 1867, v. 2, p. 83.

Answer to inquiry of H. Burt; habits of larva of Bibio albipennis.

258. [Walsh, B. D.] [Lice on horses.] < Pract. Ent., April, 1867, v. 2, p. 83.

Answer to inquiry of L. West; comparative characters of *Pediculina* and *Mallophaga*.

259. [Walsh, B. D.] [Cocoon on wild cherry.] < Pract. Ent., April, 1867, v. 2, p. 83.

Answer to inquiry of A. A. Baker; sexual differences of Attacus promethea; food-plants of its larva.

260. [Walsh, B. D.] [Lepidopterous case-bearer.] < Pract. Ent., April, 1867, v. 2, p. 83.

Answer to inquiry of J. H. Hunt; larval characters of case-bearing Lepidoptera.

261. [Walsh, B. D.] ["Thousand-legged worms."] < Pract. Ent., April, 1867, v. 2, p. 83.

Answer to inquiry of J. H. Parsons; *Iulus virgatus* eating dead seeds; injurious habits of species of *Polydesmus*.

262. [Walsh, B. D.] [Toads: Glorified squash-bug.] < Pract. Ent., 1867, v. 2, p. 83.

Answer to inquiry of F. C. Hill; food of toads; poisonousness of *Prionotus* novenarius [= Prionidus cristatus].

263. [Walsh, B. D.] [Galls on blackberry.] < Pract. Ent., April, 1867, v. 2, pp. 83-84.

Answer to inquiry of J. H. Tice; identification of the gall of *Diastrophus* nebulosus; genera of *Cynipidw* confined to single plants.

264. [Walsh, B. D.] [Bark-lice.] < Pract. Ent., April, 1867, v. 2, p. 84.

Answer to inquiry of Dr. Houghton; comparative harmlessness of Coccus harrisii [= Chionaspis furfurus]; means against Coccidæ.

265. [Walsh, B. D.] [Plant-lice.] < Pract. Ent., April, 1867, v. 2, p. 84.

Answer to inquiry of E. Orton; description of eggs of Lachnus strobi; means against Aphididæ.

266. [Walsh, B. D.] [Bag-worms.] < Pract. Ent., April, 1867, v. 2, pp. 84–85.

Answer to inquiry of J. Murphy; food-habits and means of dispersal of Thy-ridopteryx cphemeræformis.

267. [WALSH, B. D.] [Insects injurious to grape.] <Pract. Ent., April, 1867, v. 2, p. 85.

Answer to inquiry of J. Wood; supposed Curculio punctures in grapes.

268. [Walsh, B. D.] [Attacus promethea.] < Pract. Ent., April, 1867, v. 2, p. 85.

Answer to inquiry of J. B. Lyon; mention of undetermined parasite of Attacus promethea.

269. [Walsh, B. D.] [Borer in hickory.] < Pract. Ent., April, 1867, v. 2, p. 85.

Answer to inquiry of B. Norris; characters of young and mature larva of Clytus [= Cyllene] pictus.

270. [WALSH, B. D.] [Apple-tree plant-lice.] < Pract. Ent., April, 1867, v. 2, p. 85.

Answer to inquiry of W. U. Linn; identification of eggs of Aphis mali; enemies of the same.

- - Answer to inquiry of I. Hicks; parasites and enemies of undescribed barklouse on tulip-tree; Thyridopteryx ephemeræformis destructive to evergreens.
- 272. W[ALSH], B. D. The grape-vine Fidia. (Fidia viticida, new species.) < Pract. Ent., May, 1867, v. 2, pp. 87-88, fig.
  - Ravages, description, and figure of Fidia viticida n. sp.; modification of the clasping organs of insects.
- 273. W[ALSH], B. D. Enemies of the rice crop. <Pract. Ent., May, 1867, v. 2, p. 89.
  - Injuries caused by and means adopted against the water-weevil [=Lissorhop-trus simplex] and the rice-grub = [Chalepus trachypygus.]
- 274. [Walsh, B. D.] The canker-worm once more. < Pract. Ent., May, 1867, v. 2, p. 89. Abstract: < Cultivator and Country Gentleman, 6 June, 1867, v. 29, p. 370.
  - Extract from and review of W. G. C.'s "My trials with the canker-worms: remedy" (Iowa Homestead, 13 March, 1867); sorghum as a means against *Anisopteryx*.
- 275. W[ALSH], B. D. None so blind as those who shut their eyes. <a href="#">< Pract. Ent., May, 1867</a>, v. 2, pp. 89–90.
  - Criticism of error by editors of agricultural papers; rate of eastward progress of *Doryphora* 10-lineata.
- 276. W[ALSH], B. D. Self-taught entomologists. <Pract. Ent., May, 1867, v. 2, pp. 91-92.
  - Criticism of misstatements found in agricultural papers; first occurrence of Doryphora 10-lineata in Illinois in 1864.
- 277. W[ALSH], B. D. Pear-tree and apple-tree insects. < Pract. Ent., May, 1867, v. 2, pp. 92-93.
  - Food-plants of Attacus cecropia, Clisiocampa americana, and Saperda bivittata [= candida].
- 278. W[ALSH], B. D. More universal remedies. <Pract. Ent., May, 1867, v. 2, p. 93. .
  - Reprint and criticism of "Destruction of insects" (Mo. Rept. Bureau Agric., February, 1867, p. 60).
- 279. W[ALSH], B. D. Hop-growing in the West. < Pract. Ent., May, 1867, v. 2, pp. 93-94.
  - Occurrence in Michigan of *Phorodon humuli*; its destructiveness; popular ignorance of entomology.
- 280. W[ALSH], B. D. The wheat midge—jumping to a conclusion. <Pract. Ent., May, 1867, v. 2, p. 94.
  - Extract, with comment, from Maryland Farmer and Mechanic, August, 1865;

    Diplosis tritici not infested with parasites in America; food-habits of

    Thrips.

- 281. W[ALSH], B. D. Tree cut-worms. < Pract. Ent., May, 1867, v. 2, p. 94.
  - "Dark-sided cut-worm" an Agrotis and not Hadena chenopodii [= Mamestra trifolii]. See Nos. 85, 229.
- 282. W[ALSH], B. D. Quacks and physicians. < Pract. Ent., May, 1867, v. 2, p. 95.
  - Criticism of proposed universal remedy against insects injurious to the rose (Western Rural, 30 March, 1867).
- 283. W[ALSH], B. D. The ephemeron or May-fly. < Pract. Ent., May, 1867, v. 2, p. 95.
  - Length of duration of life of Ephemerida.
- 284. W[ALSH], B. D. A groundless fear. < Pract. Ent., May, 1867, v. 2, p. 95.
  - Extract from Mo. Rept. Bureau Agric., February, 1867, p. 62; food-habits of larva and image of Lytta atrata [= Epicauta pennsylvanica]; places of oviposition.
- 285. W[ALSH], B. D. Fire-blight. < Pract. Ent., May, 1867, v. 2, p. 96.

Probable cause.

- 286. [Walsh, B. D.] [Insect eggs.] < Pract. Ent., May, 1867, v. 2, p. 96.
  - Answer to inquiry of W. Willock; identification of eggs of *Ecanthus niveus* and of one of the *Membracidw* on grape twigs.
- 287. [Walsh, B. D.] [Attacus cecropia.] < Pract. Ent., May, 1867, v. 2, p. 96.
  - Answer to inquiry of J. B. H.; characters of Attacus cecropia.
- 288. [Walsh, B. D.] [Twig pruners.] < Pract. Ent., May, 1867, v. 2, p. 96.
  - Answer to inquiry of M. W. Philips; twigs of pear and other trees amproated in the same manner as oak twigs by  $Elaphidion\ putator\ [=villosum]_r$
- 289. [Walsh, B. D.] [Blister-beetles.] < Pract. Ent., May, 1867, v. 2, p. 97.
  - Answer to inquiry of J. M. Tracy; food-habits, ravages, and means against  $Lytta \ [= Pomphop \alpha a] \ anea;$  food-plants of  $L. \ [= P.] \ tarsalis;$  tabular separation of three species of  $Lytta \ [= Pomphop \alpha a].$
- 290. [Walsh, B. D.] [Means against Curculio: Estridee.] < Pract. Ent., May, 1867, v. 2, p. 97.
  - Answer to inquiry of C. Greene; ineffective means against Conotrachelus nenuphar; Estrida infesting the ox and rabbit.
- 291. [Walsh, B. D.] [Insect éggs.] < Pract. Ent., May, 1867, v. 2, p. 97.
  - Answer to inquiry of P. Ferris; identification of eggs of Clisiocampa sylvatica [=disstria] and Aphis mali.

292. W[ALSH], B. D. The wheat midge. <Pract. Ent., June, 1867, v. 2, pp. 99-101.

Extract from letter from S. S. Rathvon, with remarks; natural history of Diplosis tritici.

293. W[ALSH], B. D. The new or Colorado potato-bug. <Pract. Ent., June, 1867, v. 2, pp. 101-102.

Distribution, habits, and extent of injuries of Doryphora 10-lineata.

294. [Walsh, B. D.] [Gall-flies; saw-flies.] < Pract. Ent., June, 1867, v. 2, pp. 102–103.

Answer to inquiry of M. W. Philips; mention of various insects which are gall-makers; their modes of life; characters of the larvæ of Cecidomyidæ and Tenthredinidæ.

- 295. [Walsh, B. D.] [Bark-beetles.] < Pract. Ent., June, 1867, v. 2, p. 103.
  - Answer to inquiry of W. C. Fish; identification of specimens sent; habits of *Tomicus pusillus* [= Pityophthorus minutissimus] and of T. ramulorum [= P. micrographus].
- 296. [Walsh, B. D.] [Apple-tree insects.] < Pract. Ent., June, 1867, v. 2, p. 103.

Answer to inquiry of S. Cassi; characters, food-plants, and ravages of Arctia [=Spilosoma] virginica; supposed work of Epicarus imbricatus.

297. [Walsh, B. D.] [Attacus cecropia.] < Pract. Ent., June, 1867, v. 2, p. 103.

Answer to inquiry of T. McGraw; larve of Attacus cecropia usually solitary.

298. [Walsh, B. D.] [Grape-vine flea-beetle.] < Pract. Ent., June, 1867, v. 2, p. 103.

Answer to inquiry of A. Kelley; hibernation of the image of Haltica chalybea; ravages and means against the same.

299. [Walsh, B. D.] [Sphyracephala brevicornis.] < Pract. Ent., June, 1867, v. 2, p. 103.

Answer to inquiry of H. B. Howarth; characters and habitat of Sphyrace-phala brevicornis.

300. [Walsh, B. D.] [May-bug.] < Pract. Ent., June, 1867, v. 2, р. 103.

Answer to inquiry of C. H. R.; characters and food-habits of the larva of Lachnosterna quercina [==fusca].

301. [Walsh, B. D.] [Blister-beetles: plant-louse enemy.] < Pract. Ent., June, 1867, v. 2, p. 104.

Answer to inquiry of Dr. Houghton; food-habits of  $Lytta = Pomphop \alpha a$  and L = P. sayi; Chilocorus bivulnerus as a means against Coccide.

302. [Walsh, B. D.] [Blackberry borers.] < Pract. Ent., June, 1867, v. 2, p. 104.

Answer to inquiry of A. S. Fuller; characters of undetermined larva (*Æge-ria?*) and of *Oberea perspicillata* [== bimaculata] boring in blackberry stems; food-habits of *Ægeridæ*.

- 303. W[ALSH], B. D. Scientific nomenclature. <Pract. Ent., July, 1867, v. 2, pp. 105-106.
  - Criticism of the practice of establishing new genera upon slight characters, as illustrated by the American silk-worms.
- 304. W[ALSH], B. D. Currant plant-lice (Aphis ribis). <Pract. Ent., July, 1867, v. 2, p. 106.
  - Method of work of Aphis [=Myzus] ribis.
- 305. [Walsh, B. D.] [Lucanus elaphus.] < Pract. Ent., July, 1867, v. 2, p. 107.
  - Answer to inquiry of S. Haycraft; characters and habits of *Lucanus elaphus*; rarity of the Q; use of prolonged jaws in Z insects.
- 306. [Walsh, B. D.] [New York weevil.] < Pract. Ent., July, 1867, v. 2, p. 107.
  - Answer to inquiry of T. Gregg; habits and distribution of Ithycerus noveboracensis.
- 307. [Walsh, B. D.] [Codling-moth.] < Pract. Ent., July, 1867, v. 2, p. 107.
  - Answer to inquiry of H. Morey; number of broods, habits, etc., of Carpocapsa pomonella.
- 308. [Walsh, B. D.] [Hickory borer, etc.] < Pract. Ent., July, 1867, v. 2, p. 107.
  - Answer to inquiry of T. Wiggins; times of emergence of Clytus [=Cyllene] pictus and C. [=C.] robiniæ; habits of Corydalus cornutus.
- 309. [Walsh, B. D.] [Wasps.] < Pract. Ent., July, 1867, v. 2, p. 107. Answer to inquiry of G. W. Smith; food-habits of digger-wasps.
- 310. [Walsh, B. D.] [Parasitic flies, etc.] < Pract. Ent., July, 1867, v. 2, pp. 107–108.
  - Answer to inquiry of S. P. Monks; method of transformation of parasitie Hymenoptera; use of Latin plurals for English words.
- 311. [Walsh, B. D.] [Workers among Hymenoptera.] < Pract. Ent., July, 1867, v. 2, p. 108.
  - Answer to inquiry of W. V. Andrews; economy of workers among the social Hymenoptera.
- 312. [Walsh, B. D.] [Cut-worms.] < Pract. Ent., July, 1867, v. 2, p. 108.
  - Answer to inquiry of V. Abbey; means against Agrotis sp.?
- 313. [Walsh, B. D.] [Potato-beetle enemies.] < Pract. Ent., July, 1867, v. 2, p. 108.
  - Answer to inquiry of W. Smith; scutellerid enemy of larva of Doryphora 10-lineata; katydids as an enemy of the same.
- 314. [Walsh, B. D.] [Black-bug.] < Pract. Ent., July, 1867, v. 2, p. 108.
  - Answer to inquiry of J. R. Tewksbury; characters and habits of *Pirates* [= Melanolestes] picipes.

- 315. [Walsh, B. D.] [Burying-beetles.] < Pract. Ent., July, 1867, v. 2, p. 108.
  - Answer to inquiry of A. D. Strong; characters of Necrophorus marginatus; habits of Silphidæ; mite parasites of Silphidæ and other beetles.
- 316. [Walsh, B. D.] [Insects named.] < Pract. Ent., July, 1867, v. 2, p. 108.
  - Answer to inquiry of M. S. Hill; identification of specimens sent; food-plants of larva of Chrysomela [= Gastroidea] cyanea.
- 317. [Walsh, B. D.] [Spring-tails.] < Pract. Ent., July, 1867, v. 2, pp. 108-109.
  - Answer to inquiry of E. Daggy; characters, habits, and means against Poduridæ.
- 318. [Walsh, B. D.] [Blackberry gall insects.] < Pract. Ent., July, 1867, v. 2, p. 109.
  - Answer to inquiry of Aculeus; number of abdominal segments of *Diastrophus* and *Aulax*; reasons for considering the former the gall-maker and the latter the guest-fly.
- 319. [Walsh, B. D.] [Pine and cedar longicorns.] < Pract. Ent., July, 1867, v. 2, p. 109.
  - Answer to inquiry of J. Barratt; sexual characters and food-habits of Callidium antennatum and C. janthinium.
- 320. [Walsh, B. D.] [White-pine plant-louse, etc.] < Pract. Ent., July, 1867, v. 2, p. 109.
  - Answer to inquiry of C. H. Peck; *Lachnus strobi* on *Pinus strobus*; undetermined bark-louse, with enormous lateral thoracic plates, found on *Rhus glabra*.
- 321. [Walsh, B. D.] [Cut-worms.] < Pract. Ent., July, 1867, v. 2, p. 109.
  - Answer to inquiry of J. Townley; food-habits of climbing cut-worms.
- 322. [Walsh, B. D.] [Currant plant-louse.] < Pract. Ent., July, 1867, v. 2, pp. 109, 110.
  - Answer to inquiry of R. L. Walker; Coccinellidae as a means against Aphis [= Myzus] ribis.
- 323. [Walsh, B. D.] [Beetles.] < Pract. Ent., July, 1867, v. 2, p. 110.

  Answer to inquiry of I. A. Plucke; characters and food-habits of Tetraopes tornator [= tetraophthalmus] and of T. femoratus; comparative characters of Chrysomela bigsbyana and of C. philadelphica; characters of Chrysomelidæ and Coccinellidæ.
- 324. W[ALSH], B. D. Fertilizing plants. < Pract. Ert., July, 1867, v. 2, p. 110.
  - Part played by insects in fertilizing plants.
- 325. W[ALSH], B. D. The peach-worm. <Pract. Ent., July, 1867, v. 2, p. 110.
  - Larvæ of Ephestia zew [=interpunetella] injurious to dried peaches; foodplants and enemies of the same.

- 326. W[ALSH], B. D. Valedictory. <Pract. Ent., August-September, 1867, v. 2, p. 111.
  - Note of thanks for aid received in editing the Practical Entomologist.
- 327. W[ALSH], B. D. The State entomologist of Illinois. < Pract. Ent., August-September, 1867, v. 2, p. 111. Reprint: < Can. Farmer, 1 October, 1867, v. 4. S.-b., No. 2, p. 98.
  - Bill for appointment of State entomologist of Illinois not carried into effect.
- 328. W[ALSH], B. D. The three so-called army worms. <Pract. Ent., August-September, 1867, v. 2, pp. 111-114.
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- 329. W[ALSH], B. D. The little Turk and its crescent. < Pract. Ent., August-September, 1867, v. 2, pp. 114-115.

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- 330. [Walsh, B. D.] Apple-worm. (Carpocapsa pomonella.) < Pract. Ent., August-September, 1867, v. 2, p. 115.

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- 331. W[ALSH], B. D. Spindle-worms. < Pract. Ent., August-September, 1867, v. 2, pp. 115-116.
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- 332. W[ALSH], B. D. A plant growing out of an insect. <Pract. Ent., August-September, 1867, v. 2, p. 116.
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- 333. [Walsh, B. D.] The imported gooseberry saw-fly. <a href="Pract.Ent.">Pract. Ent.</a>, August-September, 1867, v. 2, p. 116.
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- 334. W[Alsh], B. D. The Colorado potato-bug. <Pract. Ent., August-September, 1867, v. 2, p. 116.
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- 335. W[ALSH], B. D. Apple-tree plant-lice. (Aphis mali.) < Pract. Ent., August-September, 1867, v. 2, pp. 116-117. Effects of early frosts on Aphis mali.
- 336. W[ALSH], B. D. The tent-caterpillar of the apple-tree. (Clisio-campa americana.) < Pract. Ent., August-September, 1867, v. 2, p. 117.
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- 337. [Walsh, B. D.] A new foe of the corn. < Pract. Ent., August-September, 1867, v. 2, pp. 117-118.
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- 338. [Walsh, B. D.] [*Rhyssa atrata.*] < Pract. Ent., August-September, 1867, v. 2, p. 118.
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- 339. [Walsh, B. D.] [Grape-vine beetles.] <Pract. Ent., August-September, 1867, v. 2, p. 118.
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- 340. [Walsh, B. D.] [Currant insects.] < Pract. Ent., August-September, 1867, v. 2, p. 118.
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- 344. [WALSH, B. D.] [Maple bark-louse.] <Pract. Eut., August-September, 1867, v. 2, p. 119.
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- 347. [Walsh, B.D.] [Potato beetles: Cicindela sex-guttata.] < Pract. Ent., August-September, 1867, v. 2, p. 119.
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- 348. [Walsh, B. D.] [Wavy-striped flea-beetle.] < Pract., Ent., August-September, 1867, v. 2, p. 119.
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- 352. [WALSH, B. D.] [Chrysobothris femorata.] < Pract. Ent., August-September, 1867, v. 2, p. 119.
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- 359. [Walsh, B. D.] [Insects named.] <Pract. Ent., August-September, 1867, v. 2, p. 120.
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- 361. [Walsh, B. D.] [Yellow swallow-tail; Rose-beetle.] < Pract. Ent., August-September, 1867, v. 2, p. 120.
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- 362. [Walsh, B. D.] [Blister-beetles.] < Pract. Ent., August-September, 1867, v. 2, p. 120.
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- 363. [Walsh, B. D.] [Tent-caterpillars.] < Pract. Ent., August-September, 1867, v. 2, p. 121.
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- **364.** [Walsh, B. D.] [Currant-worms.] < Pract. Ent., August-September, 1867, v. 2, p. 121.
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- 365. [Walsh, B. D.] [Potato-beetle enemies.] < Pract. Ent., August-September, 1867, v. 2, p. 121.
  - Answer to inquiry of W. Maus; description and habits of Lebia grandis; hemipterous enemies of Doryphora 10-lineata.
- 366. W[ALSH], B. D. The Colorado potato-bug. <Pract. Ent., August-September, 1867, v. 2, p. 121.
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- 367. [Walsh, B. D.] Entomology. < Prairie Farmer, December, 1867, [v. 36], n. s., v. 20, pp. 358-359.
  - Address, with discussion by others, at the third annual meeting of the Southern Illinois Fruit Growers and Shippers' Association; ravages and means against Pemphigus pyri [= Schizoneura lanigera], Carpocapsa pomonella, Trypeta pomonella, Scmasia [= Grapholitha] pruinivora, Caliodes [= Craponius] inaqualis, Conotrachelus nenuphar.
- **368.** Walsh, B. D. The grasshoppers. <Iowa Homestead, 15 January, 1868 (v. 13?), p. 9. S.-b., No. 2, p. 119.
  - Range of swarms of Caloptenus spretus in Iowa in 1867.
- 369. Walsh, B. D. Birds vs. insects. < Prairie Farmer, 1868, [v. 37], n. s., v. 21; 30 May, pp. 346-347; 6 June, pp. 362-363; 13 June, pp. 378, 379.

- 370. Walsh, B. D. The seventeen-year locust. <Dixie Farmer, 11 June, 1868. S.-b., No. 3, p. 23.
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- 371. Walsh, B. D. Entomological. Do locusts sting? < Chicago Republican, 1868. S.-b., No. 3, p. 25.
  - Sting of Cicada not poisonous; sting of Stizus grandis [== Sphecius speciosus] mistaken for it; habits of the Stizus.
- 372. Walsh, B. D. The bug-hunter in Egypt. A journal of an entomological tour into south Illinois by the senior editor. <Amer. Ent., 1868, v. 1; September, pp. 6-14, figs. 1-7; October, pp. 29-36, figs. 23-29.
  - Habits and figures of Macronewa zebratum, Palingenia [= Hexagenia] bilineata, Cicada sp., Stizus grandis [= Sphecius speciosus], Xylocopa carolina [= virqinica], and Authophova sponsa [= abvupta]; sting of Cicada not poisonous, that of the Stizus mistaken for it; habits of Conotrachelus nenuphar; description of Hull's Curculio-catcher; Conotrachelus anaglypticus and Colaspis sp. injurious to plum-trees; figures of Rhopalus sp. and Euryomia [= Euphoria | melaucholica injurious to pear-trees; figure and habits of Metapodius nasalus [= fcmoratus]; predaceous habits of Arma [= Podisus] spinosus, Evagoras vividis [=Diplodus luridus], and Stiretrus fimbriatus [=anchorago]; work of Aspidiotus harvisii [= Chionaspis furfurus] upon pear, and of Cecidonyia [= Diplosis] tritici in wheat; occurrence of Endrosa [= Lachnosterna] quercus, Doryphorajuncta, and Trichius delta in Illinois; mite enemy of Aspidiotus conchiformis [= Mytilaspis pomorum]; injury to fruit by Apis mellifica; hot water as a means against Schizoueura lanigera; habits and figures of Chrysopa sp.; figures of Aspidoglossa subangulata, Harpalus pennsylvanicus, and Evarthrus orbatus; figures and descriptions of larva of a carabid and of Chauliognathus penusylvanicus; Curculio-feeding habits of Carabidæ.
- 373. Walsh, B. D. First annual report on the noxious insects of the State of Illinois. <Trans. Ill. State Hortic. Soc. for 1867, n. s., v. 1, Appendix. Separate: <Chicago, 1868, 103 pp., figs. 1-3.

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- 375. Walsh, B. D. Appendix to the article on "Wasps and their habits," in No. 7. < Amer. Ent., April, 1869, v. 1, pp. 162-164.
  - Habits of Chrysididæ; descriptions of Stizus [Megastizus] brevipennis n. sp., Agenia subcorticalis n. sp., A. architectus Say, A. cupida Cress., A. bombycina Cress., Ceropales rufiventris n. sp., and Ammophila pictipennis n. sp.; tabular separation of the genera of Sphecidæ. See No. 543.
- 376. Walsh, B. D. Mr. Couper's thorn-leaf gall. <Ca. Ent., 15 April, 1869, v. 1, pp. 79-80.
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- 377. Walsh, B. D. The six worst insect enemies of the fruit growers in northern Illinois. <a href="trans.">Trans.</a> North. Ill. Hortic. Soc. for 1867-768, pp. 91-96.
  - Treats of Carpocapsa pomonella, Aspidiotus conchiformis [=Mytilaspis pomorum], Anisopteryx [= Paleacrita] vernata, Saperda bivittata [= candida], Chrysobothris femorata, Conotrachelus nenuphar, and Anthonomus prunicida [= Coccotorus scutellaris].
- 378. Walsh, B. D. Squash borer. < Cultivator and Country Gentleman, 30 September, 1869, v. 34, p. 256. Extract: < Prairie Farmer, 30 October, 1869.
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- 379. Walsh, B. D. Apple-tree borers. <Journ. Ill. State Agric. Soc. Reprint: <Trans. Ill. State Agric. Soc., v. 5, pp. 499-501.
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- 380. Walsh, B. D. On a species of *Hemiteles* (*Ichneumonidæ*), ascertained by the editor to be parasitic in Canada on the imported current-worm fly (*Nematus ventricosus* Klug). <Can. Ent., 1 October, 1869, v. 2, pp. 9-12.
  - Division of *Hemiteles* into two groups; description of *H. nemativorus* n. sp.; larval and pupal history of the same by C. J. S. Bethnne.
- 381. Walsh, B. D. The imported currant-worm fly (Nematus ventricosus Klug) and its parasite (Hemiteles nemativorus Walsh) <a href="#"><Ca. Ent., 15 November, 1869</a>, v. 2, pp. 31–33.
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- 382. Walsh, B. D. Larvæ in the human bowels. One of Mr. Walsh's posthumous articles. <Amer. Ent., March, 1870, v. 2, pp. 137–141, fig. 93.
  - Characters and habits of larval *Homalomyia*; description of the larva of *H. wilsoni*, *H. leidyi*, and *H. prunivora* n. spp.; mention of recorded cases of diptera in the human bowels; figures larva of *H. wilsoni*.

383. Walsh, B. D. One day's journal of a State entomologist. <Amer. Ent. and Bot., May, 1870, v. 2, pp. 197-199.

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- 384. Walsh, B. D. On the group *Eurytomides* of the hymenopterous family *Chalcidide*; with remarks on the theory of species and a description of *Antigaster*, a new and very anomalous genus of *Chalcidide*. <Amer. Ent. and Bot., 1870, v. 2, September, pp. 297–301, fig. 1, 2; October, pp. 329–335, fig. 3–6; December, pp. 367–370, fig. 7–10.
  - Descriptions, habits, and figures of many *Eurytomides*; synoptic tables of the species of *Eurytoma* and *Decatoma*. For a list of the new species see the *Systematic Index*.
- 385. Walsh, B. D. Descriptions of North American Hymenoptera. <Trans. Acad. Sci. St. Louis, 7 May—9 June, 1873, v. 3, pp. 65–166, fig.
  - Printed posthumously, with notes by E. T. Cresson; description of many previously described *Tenthredinidæ* and *Ichneumonidæ*; five (5) new genera and forty-five (45) new species of *Ichneumonidæ* are described, for a list of which see the *Systematic Index*; figures venation of front wing of *Ichneumona*.

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 $\mathbf{OF}$ 

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BY

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## BIBLIOGRAPHY OF THE MORE IMPORTANT CONTRIBUTIONS TO AMERICAN ECONOMIC ENTOMOLOGY.

### PART II.

- 386. [Walsh, B. D., and C. V. Riley.] Salutatory. To the agriculturists and horticulturists of the United States. <Amer. Ent., September, 1868, v. 1, pp. 1-3.
  - Importance and extent of the ravages of insects; practicability of the diminution of these ravages; value of entomological work; aims of the American Entomologist.
- 387. [Walsh, B. D., and C. V. Riley.] Hogs vs. bugs. < Amer. Ent., September, 1868, v. 1, pp. 3-6.
  - Effectiveness of swine as a means against Conotrachelus nenuphar and Carpocapsa pomonella; quotations showing good results from pasturing swine in fruit orchards.
- 388. [Walsh, B. D., and C. V. Riley.] Insect changes. <Amer. Ent., September, 1868, v. 1, p. 6.
  Definition of the different stages of insect transformation.
- 389. [Walsh, B. D., and C. V. Riley.] A new bark-louse on the osage orange. <Amer. Ent., September, 1868, v. 1, p. 14, fig. 8. Seasons, food-plants, characters, and figures of Lecanium macture in sp., [=Pulvinaria innumerabilis] and of L. acericola in sp. [= P. innumerabilis]; characters and economic importance of the genus Aspidiotus.
- 390. [Walsh, B. D., and C. V. Riley.] Entomological ignorance in the South. <Amer. Ent., September, 1868, v. 1, pp. 14-16.

  Reprint and criticism of article, "How to destroy the cotton-worm—a suggestion."
- 391. [Walsh, B. D., and C. V. Riley.] Grasshoppers. <Amer. Ent., September, 1868, v. 1, p. 16.
  - Ravages of Acrididæ in Illinois, Iowa, and Missouri; mention of the species committing these ravages; means against the same.
- 392. [Walsh, B. D., and C. V. Riley.] The old and the new philosophy. <Amer. Ent., September, 1868, v. 1, p. 17.

  Defense of the practical application of science.
- 393. [Walsh, B. D., and C. V. Riley.] The animal kingdom. < Amer. Ent., September, 1868, v. 1, pp. 17-18.
  - Definition of the "four grand branches of the animal kingdom;" mention of their respective classes.

- 394. [Walsh, B. D., and C. V. Riley.] Ad interim committees. <Amer. Ent., September, 1868, v. 1, p. 18.
  - Duties of ad interim committees of horticultural societies; the American Entomologist ready to publish any scientific discoveries or observations with regard to rots or diseases of a vegetal nature.
- 395. [Walsh, B. D., and C. V. Riley.] On our table. < Amer. Ent., September, 1868, v. 1, p. 18.
  - Notice of W. H. Edwards's "The butterflies of North America," pt. 1; of A. S. Packard, jr.'s "Guide to the study of insects," pt. 2; and of the "Canadian Entomologist," v. 1, No. 1.
- 396. [Walsh, B. D., and C. V. Riley.] "Fire-flies." < Amer. Ent., September, 1868, v. 1, p. 19, fig. 9.
  - Answer to inquiry of W. McC.; characters and transformations of *Photinus* pyralis; figures larva, with details of structure, pupa, and imago.
- 397. [Walsh, B. D., and C. V. Riley.] A new grape root-borer. <Amer. Ent., September, 1868, v. 1, p. 19.
  - Answer to inquiry of W. D. F. Lummis; characters and ravages of an undetermined longicorn larva; food-habits of Orthosoma eylindrieum [==brunneum].
- 398. [Walsh, B.D., and C.V. Riley.] Bugs on grape-vines mistaken for chinch-bugs. <Amer. Ent., September, 1868, v. 1, p. 19.

  Answer to inquiry of F. Hecker; characters, ravages, and food-plants of Blissus leucopterus and of Piesma einerea.
- 399. [Walsh, B. D., and C. V. Riley.] Leaf-hoppers of the grape. <Amer. Ent., September, 1868, v. 1, p. 19.
  - Answer to inquiry of F. Hecker; characters and ravages of *Proconia* [= Oncometopia] undata.
- 400. [Walsh, B. D., and C. V. Riley.] Leaf bugs. < Amer. Ent., September, 1868, v. 1, p. 19.
  - Answer to inquiry of C. H. Peck; food-habits of Tingis = Gargaphia tiliæ and of T. = Corythuca ciliata; punctures on leaves caused by Hemiptera.
- 401. [WALSH, B. D., and C. V. RILEY.] Potato bugs. <Amer. Ent., 1868, v. 1, October, pp. 21–27, fig. 10–19; November, pp. 41–49, fig. 33–48.
  - Failure of popular authors to distinguish between the different insects infesting the potato plant; brief accounts and figures of one or more stages of the following species: Gortyna nitela, Baridius [= Trichobaris] trinotata, Sphinx 5-maculata [= Protoparce celeus], Lytta [= Epicauta] vittata, L. atrata [= E. pennsylvanica], L. marginata [= E. cinerea], L. cinerea [= Macrobasis unicolor], L. murina [= M. unicolor], Lema trilineata, and Haltica [= Crepidodera] cucumeris; migrations, habits, enemies, and means against Doryphora 10-lineata; figures of all stages of D. 10-lineata and D. juncta and of numerous enemies of the former.
- 402. [Walsh, B. D., and C. V. Riley.] "Grasshoppers." Their devastations in western Iowa and the good that has resulted from them. <Amer. Ent., October, 1868, v. 1, pp. 27–28.
  - Letter of M. C. Nickerson, with comments; seeds of Vilfa vaginæflora carried by "grasshoppers."

- 403. [WALSH, B. D., and C. V. RILEY.] An apple growing on a grapevine. <Amer. Ent., October, 1868, v. 1, p. 28.

  Extract from Richmond (Va.) Whia with criticism: a gall of Cacidomyia vitio
  - Extract from Richmond (Va.) Whig, with criticism; a gall of Cecidomyia vitispomum mistaken for an apple growing on a grape-vine. See Nos. 332, 436, 478.
- 404. [Walsh, B. D., and C. V. Riley.] Ticks and Texas fever.

   < Amer. Ent., October, 1868, v. 1, p. 28.

  Improbability that *Ixodes bovis* is the eause of the Texas fever of eattle.
- 405. [Walsh, B. D., and C. V. Riley.] Scientific symbols. <Amer. Ent., October, 1868, v. 1, p. 28. Reprint: <Op. cit., November, 1869, v. 2, p. 50.

Explanation of the use of the signs designating the sexcs.

- 406. [Walsh, B. D., and C. V. Riley.] A swarm of butterflies. <a href="mailto:Amer. Ent."><a href="mailto:Amer. Ent.">Amer. Ent.</a>, October, 1868, v. 1, pp. 28–29, figs. 20–22.

  Record of swarms of Danais archippus; food-plant of larva; figures larva, chrysalis, and imago.
- 407. [WALSH, B. D., and C. V. RILEY.] The sting of the 17-year Cicada. <Amer. Ent., October, 1868, v. 1, pp. 36-37. Communications from F. W. Collins, R. Riehardson, and B. Borden, on the reputed sting of Cicada [= Tibicen] septendecim and on the habits of Stizus grandis [= Sphecius speciosus].
- 408. [Walsh, B. D., and C. V. Riley.] On our table. <Amer. Ent., October, 1868, v. 1, p. 37.

  Notice of "The insect world," by L. Figuier.
- 409. [WALSH, B. D., and C. V. RILEY.] Squash-bug; its change of color. <Amer. Ent., October, 1868, v. 1, p. 37.</li>
  Answer to inquiry of J. Periam; changes of color of Coreus [= Anasa] tristis during its metamorphoses.
- 410. [Walsh, B. D., and C. V. Riley.] White grub; immunity from it next year in Clinton County, Mo. <Amer. Ent., October, 1868, v. 1, p. 37.
  - Answer to inquiry of J. P. McCartney; life-habits of Lachnosterna fusca.
- 411. [WALSH, B. D., and C. V. RILEY.] Insect enemies of the Colorado potato beetle. <Amer. Ent., October, 1868, v. 1, p. 37.

  Answer to inquiry of S. H. Kriedelbaugh; identification of three insect enemies of Doryphora 10-lineata.
- 412. [WALSH, B. D., and C. V. RILEY.] "Harvest-bugs" in America, misnamed "jiggers." <Amer. Ent., October, 1868, v. 1, p. 38.

  Answer to inquiry of M. McKenzie; habits of parasitic Acarina; distribution of and injuries caused by Sarcopsylla penetrans.
- 413. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., October, 1868, v. 1, p. 38.
  - Answer to inquiry of J. T. Smith; food-plants of Aphis mali and of Notodonta [= Œdcmasia] concinna; Campoplex [= Limneria] fugitiva parasitic on larva of Euchwtes eglc.
- 414. [Walsh, B. D., and C. V. Riley.] Grapes cut off by the tree cricket. <Amer. Ent., October, 1868, v. 1, p. 38, fig. 30-31.

  Answer to inquiry of J. H. Tice; food-habits of *Ecanthus niveus*; deposition

of eggs; figures both sexes.

- 415. [Walsh, B. D., and C. V. Riley.] The Buffalo tree-hopper. <Amer. Ent., October, 1868, v. 1, p. 38.
  - Answer to inquiry of P. Rickert; characters, habits, and means against Ceresa bubalus.
- 416. [Walsh, B. D., and C. V. Riley.] A scavenger mistaken for a foe. <Amer. Ent., October, 1868, v. 1, p. 38.
  - Answer to inquiry of Simmons and Tillson; characters and habits of the larva of Copris carolina.
- 417. [Walsh, B. D., and C. V. Riley.] Insect foes of the bark-louse. <Amer. Ent., October, 1868, v. 1, p. 39, fig. 32.
  - Answer to inquiry of J. Weed; habits and figures of larva and image of Chilocorus bivulnerus; food-habits and figure of Epilachna borealis.
- 418. [Walsh, B. D., and C. V. Riley.] Best works on entomology. <Amer. Ent., October, 1868, v. 1, p. 39.
  - Answer to inquiry of B. M. Reynolds; mention of several important works on entomology.
- 419. [Walsh, B. D., and C. V. Riley.] Larvæ in plum-gum. <Amer. Ent., October, 1868, v. 1, p. 39.
  - Answer to inquiry of P. Rickert; unknown larva (probably dipterous) found in gum of plum tree; *Mycetophila* sp., bred from gum of peach-tree.
- 420. [Walsh, B. D., and C. V. Riley.] Insect foes of the hop vine. <Amer. Ent., October, 1868, v. 1, p. 39.
  - Answer to inquiry of H. C. Freeman; characters and habits of larva of Saturnia [=Hyperchiria] io and of Vanessa [=Grapta] interrogationis.
- 421. [Walsh, B. D., and C. V. Riley.] Insect foe of the apple-tree borer. <Amer. Ent., October, 1868, v. 1, p. 39.
  - Answer to inquiry of J. E. Walker; undetermined carabid larva preying upon larva of Saperda candida.
- 422. [Walsh, B. D., and C. V. Riley.] Oak tree caterpillars. < Amer. Ent., October, 1868, v. 1, p. 39.
  - Answer to inquiry of W. W. Daniells; characters and habits of larva of Edema albifrons.
- 423. [Walsh, B. D., and C. V. Riley.] Bark-lice on apple trees. <Amer. Ent., October, 1868, v. 1, p. 40.
  - Answer to inquiry of J. G. Fleck; Mytilaspis pomorum destroyed by a minute mite.
- 424. [Walsh, B. D., and C. V. Riley.] The "saddle-back" caterpillar. <Amer. Ent., October, 1868, v. 1, p. 40.
  - Answer to inquiries of E. Baxter and O. A. Kenyon; characters, habits, and urticating properties of the larva of *Empretia stimulea*.
- 425. [Walsh, B. D., and C. V. Riley.] The regal walnut caterpillar. <Amer. Ent., October, 1868, v. 1, p. 40.
  - Answer to inquiry of M. Copley; characters and food-plants of larva of Citheronia regalis; times of metamorphosis; characters of the imago.
- 426. [Walsh, B. D., and C. V. Riley.] The Hessian fly. <Amer. Ent., October, 1868, v. 1, p. 40.
  - Answer to inquiry of F. D. Carson; ravages of Cecidomyia destructor; late sowing as a means of avoiding the same.

- 427. [Walsh, B. D., and C. V. Riley.] Red cedar caterpillar. < Amer. Ent., October, 1868, v. 1, p. 40.
  - Answer to inquiry of R. Peter; habits, characters, and means against Thyridopteryx ephemeræformis.
- 428. [Walsh, B. D., and C. V. Riley.] Wheat-midge winter killed. <Amer. Ent., October, 1868, v. 1, p. 40.
  - Answer to inquiry of J. P. Alexander; cause of the scarcity of Diplosis tritici.
- 429. [WALSH, B. D., and C. V. RILEY.] Grape-vine borer. <Amer. Ent., October, 1868, v. 1, p. 40.

  Answer to inquiries of A. Barter and I. H. Hogan: undetermined corambyold
  - Answer to inquiries of A. Barter and J. H. Hogan; undetermined cerambycid larva injurious to grape-vines.
- 430. [Walsh, B. D., and C. V. Riley.] Popular names and scientific names. <Amer. Ent., November, 1868, v. 1, p. 49, figs. 49–51. Indefiniteness of popular names; figures Julus sp., and the larva and imago of one of the Elateridæ.
- 431. [Walsh, B. D., and C. V. Riley.] Entomological ignorance in the North. <Amer. Ent., November, 1868, v. 1, pp. 50-51, figs. 52-54.
  - Confusion existing in regard to the meaning of the word locust; habits of Acridida and Cicadida; figures types of the two families and of twig with eggs of Cicada sp.
- 432. [WALSH, B. D., and C. V. RILEY.] Tit for tat. <Amer. Ent., November, 1868, v. 1, p. 52.
  Ridicule of an absurd entomological item.
- 433. [WALSH, B. D., and C. V. RILEY.] Grasshoppers. <Amer. Ent., November, 1868, v. 1, p. 53.

  Abundance and ravages of several species of Acridida and of Acheta [= Gryllus]
  - abbreviatus in the northern central United States, and scarcity of the same in New York in 1868.
- 434. [Walsh, B. D., and C. V. Riley.] To keep seed peas from bugs. <a href="mailto:Amer.Ent."><a href="mailto:Amer.Ent.">Amer.Ent.</a>, November, 1868, v. 1, p. 53.

  Habits of and means against Bruchus pisi.
- 435. [Walsh, B. D., and C. V. Riley.] Mind how you pack insects. <a href="#"><Amer. Ent.</a>, November, 1868, v. 1, p. 54.

  Carc needed to avoid the introduction of noxious insects.
- 436. [Walsh, B. D., and C. V. Riley.] The apple growing on a grape vine. <Amer. Ent., November, 1868, v. 1, p. 54.

  The "vegetable phenomenon," see Nos. 332, 403, 478, proved to be a gall.
- 437. [Walsh, B. D., and C. V. Riley.] The late exhibition of useful and destructive insects at Paris. <Amer. Ent., November, 1868, v. 1, p. 55.
  - Notice of the formation of the Société d'Insectologic Agricole at Paris, and of the second exhibition of the society.
- 438. [Walsh, B. D., and C. V. Riley.] Destroying black ants in gardens. <a href="mailto:Amer. Ent.">Amer. Ent.</a>, November, 1868, v. 1, p. 55.

  Answer to inquiry of W. S. Patten; means against Formicida in gardens.

439. [Walsh, B. D., and C. V. Riley.] Entomological quackery. <a href="mailto:Amer.Ent."><a href="mailto:Amer.Ent.">Amer. Ent.</a>, November, 1868, v. 1, p. 56.

Reprint of "The Curculio (Iowa Homestead, 22d July, 1868). with comments;

means against Conotrachelus nenuphar.

440. [Walsh, B.D., and C.V. Riley.] The cruel bug-hunters. < Amer. Ent., November, 1868, v. 1, p. 56.

Insects are not susceptible of such feelings of pain and pleasure as are felt by higher animals.

- 441. [Walsh, B. D., and C. V. Riley.] Honey bees eating grapes. <Amer. Ent., November, 1868, v. 1, p. 56.
  - Reprint of a letter by T.'W., from Ohio Farmer, with comments; Apis mellifica as an enemy of sound fruit.
- 442. [Walsh, B. D., and C. V. Riley.] Twigs amputated by some unknown animal. <Amer. Ent., November, 1868, v. 1, p. 57.

  Answer to inquiry of G. Burnside; method of work of an undetermined fruit-tree pruner [= Oncideres cingulata?].
- 443. [Walsh, B. D., and C. V. Riley.] Twigs girdled by some animal. <Amer. Ent., November, 1868, v. 1, p. 57.

  Answer to inquiries of Judge Brown and P. Earle; method of work of an
  - Answer to inquiries of Judge Brown and P. Earle; method of work of an undetermined fruit-tree pruner [= Oncideres cingulata?]; trees affected.
- 444. [Walsh, B. D., and C. V. Riley.] Hop-vine caterpillar. < Amer. Ent., November, 1868, v. 1, p. 57.

  Answer to inquiry of H. J. Dunlap; larva of Grapta interrogationis feeding on hop-vines.
- 445. [Walsh, B. D., and C. V. Riley.] "Galls" on leaves of soft maple. <Amer. Ent., November, 1868, v. 1, p. 57.

  Answer to inquiry of A. L. Child; characters of undescribed mite-galls and their architects; mode of formation of leaf-galls by mites.
- 446. [Walsh, B. D., and C. V. Riley.] Unsightly galls on the cottonwood. <Amer. Ent., November, 1868, v. 1, p. 57.

  Answer to inquiry of A. L. Child; character of galls made by Pemphigus vagabondus and P. populicaulis; their effects upon the cottonwood and means against them.
- 447. [Walsh, B. D., and C. V. Riley.] Insects named. <Amer. Ent., November, 1868, v. 1, p. 57.

Answer to inquiry of E. Baxter; Gordius aquaticus a host in Orchelimum gracile; Cetonia [= Euphoria] inda destructive to the peach.

- 448. [Walsh, B. D., and C. V. Riley.] The stick-bug. <Amer. Ent., November, 1868, v. 1, p. 58. Reprint: <Can. Farmer, 15 January, 1870.
  - Description, vernacular names, and habits of Spectrum [= Diapheromera] femorata.
- 449. [Walsh, B. D., and C. V. Riley.] Woolly lice on the beech. <a href="#"></a><a href="#"><Amer. Ent.</a>, November, 1868, v. 1, p. 58.</a>

Answer to inquiry of F. H. Guiwits; habits and food-plants of Pemphigus imbricator.

- 450. [Walsh, B. D., and C. V. Riley.] The sheep-bot or head-maggot. <Amer. Ent., November, 1868, v. 1, p. 58.
  - Answer to inquiry of R. W. Seott; Estrus ovis ordinarily oviparous; sometimes the eggs hatch prematurely inside the body.
- 451. [Walsh, B. D., and C. V. RILEY.] Leaf-miners of the locust. <Amer. Ent., November, 1868, v. 1, p. 58.
  - Answer to inquiry of R. W. Seott; characters, habits, ravages, and means against *Hispa scutcllaris* [= Odontota dorsalis].
- 452. [Walsh, B. D., and C. V. Riley.] Leaf-hoppers on celery. <Amer. Ent., November, 1868, v. 1, p. 58.
  - Answer to inquiry of R. Parnell; mention of two undescribed *Tettigonidæ* infesting early eelery.
- 453. [Walsh, B. D., and C. V. Riley.] Parsnip caterpillars.—Scorpions. <Amer. Ent., November, 1868, v. 1, p. 59.
  - Answer to inquiry of F. Brewer; food-plants of larva of Papilio asterias; habits of the imago; habits and sting of Buthus carolinianus; its occurrence in Missouri.
- 454. [Walsh, B. D., and C. V. Riley.] Noxious insects named. <Amer. Ent., November, 1868, v. 1, p. 59.
  - Answer to inquiry of J. H. Parsons; larval characters and food-plants of Hyphantria textor [=cunea], Notodonta [= Edemasia] concinna, Arctia [= Spilosoma] virginica, Carpocapsa pomonella, and of Trypeta pomonella.
- 455. [Walsh, B. D., and C. V. Riley.] Cut-worms destroying recently sown wheat. < Amer. Ent., November, 1868, v. 1, p. 59. Answer to inquiry of T. R. Allen; characters, habits, and means against undetermined *Noctuidæ* attacking wheat.
- 456. [Walsh, B. D., and C. V. Riley.] The spined soldier bug. <Amer. Ent., November, 1868, v. 1, p. 59.
  - Answer to inquiry of I. Hieks; Podisus spinosus as an enemy of Hyphantria textor [= cunea].
- 457. [Walsh, B. D., and C. V. Riley.] The preying Mantis, alias Devil's riding horse, etc. <Amer. Ent., November, 1868, v. 1, p. 59.
  - Answer to inquiry of A. Pettit; habits of Mantis [=Phasmomantis] carolina; egg-mass of the same.
- 458. [Walsh, B.D., and C. V. Riley.] The pigeon Tremex. <Amer. Ent., November, 1868, v. 1, p. 59.
  - Answer to inquiry of F. Brewer; characters of Tremex columba; food-habits and parasites of its larva.
- 459. [Walsh, B. D., and C. V. Riley.] Flesh-worms. < Amer. Ent., November, 1868, v. 1, p. 59.
  - Answer to inquiry of W. J. Stuart; larval habits of an undetermined museid-
- 460. [Walsh, B. D., and C. V. Riley.] Fall web-worm on hickory. <Amer. Ent., November, 1868, v. 1, p. 59.
  - Answer to inquiry of W. W. Daniels; transformation of Hyphantria textor [=cunea]; characters of its larva and imago.

- 461. [Walsh, B. D., and C. V. Riley.] Butterflies named. < Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of W. W. Butterfield; characters of Colias philodice, Vanessa [= Grapta] comma, and Danais archippus.
- 462. [Walsh, B. D., and C. V. Riley.] Museum pest. < Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of T. W. Holt, jr.; means against Dermestida.
- 463. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of J. Weed; enemies of plant-lice and bark-lice; food-plant and characters of the larva of *Papilio turnus*.
- 464. [Walsh, B. D., and C. V. Riley.] Grapes spoiled by something. <Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of J. Wood; grapes injured from some unknown cause; juice from wounded grapes as food for moths.
- 465. [Walsh, B. D., and C. V. Riley.] White-pine worms. <Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of J. T. Little; food-plants of larva of Lophyrus abbotii; transformations of the same.
- 466. [Walsh, B. D., and C. V. Riley.] The Tarantula of Texas. <Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of J. Bell; manner in which *Pompilus* [= *Pepsis*] *formosa* prepares *Mygale hentzii* for food for its larva.
- 467. [Walsh, B. D., and C. V. Riley.] Insect foes of the apple-tree. <Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of G. C. Brackett; characters of larva of Carpocapsa pomonella; means against Datana ministra and Pemphigus pyri [=Schizoneura lanigera].
- 468. [Walsh, B. D., and C. V. Riley.] Grape-leaf folders eaten by spiders. <Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of A. A. Hilliard; larva of Desmia maculalis destroyed by a spider.
- 469. [Walsh, B. D., and C. V. Riley.] Caterpillar of the Troilus butterfly. <Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of A. S. Fuller; food-habits of larva of Papilio troilus.
- 470. [Walsh, B. D., and C. V. Riley.] Potato beetles. <Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of P. H. Foster; identification of *Epicauta vittata* and *Macrobasis unicolor* as enemics of the potato.
- 471. [Walsh, B. D., and C. V. Riley.] Holes round the roots of young ash trees in the nursery. '<a href="#">Amer. Ent.</a>, November, 1868, v. 1, p. 60.
  - Answer to inquiry of I. Hicks; characters and food-habits of the larva of Xyloryctes satyrus.
- 472. [Walsh, B. D., and C. V. Riley.] Locust borers. < Amer. Ent., November, 1868, v. 1, p. 60.
  - Answer to inquiry of U. Bruner; destructiveness of the larva of Clytus [= Cyllene] robinia.

- 473. [WALSH, B. D., and C. V. RILEY.] The hellgrammite fly. <Amer. Ent., December, 1868, v. 1, pp. 61-62, figs. 56-57.
  - Habits of Corydalus cornutus; figures the larva, pupa, and imago; description and figure of the eggs of Belostoma americanum mistaken for those of Corydalus.
- 474. [Walsh, B. D., and C. V. Riley.] The periodical Cicada. <Amer. Ent., December, 1868, v. 1, pp. 63-72, figs. 58-64. Extract: <Op. cit., June, 1869, v. 1, p. 202.
  - Characterization of the 13-year brood of Cicada as a new species, C. = Tibicen tredecim; dimorphism of the same and of C. = T. septendecim; seasons, natural history, transformations, enemies, sting, and injuries of these species; chronological history of their several known broods; figures the several stages of C. = T. septendecim, the towers made by the pupa and twigs with eggs.
- 475. [Walsh, B. D., and C. V. Riley.] The hateful or Colorado grass-hopper, *Caloptenus spretus*, Uhler and Walsh. <Amer. Ent., December, 1868, v. 1, pp. 73-76, fig. 65.
  - Comparative characters and figures of Caloptenus spretus and C. femur-rubrum; native habitat, migrations, distribution, and ravages of the former; harmlessness of its second generation in the Mississippi Valley as compared with the first generation; improbability that it will ever become a permanent resident in that region.
- 476. [Walsh, B. D., and C. V. Riley.] The twig-girdler, Oncideres cingulatus, Say. <Amer. Ent., December, 1868, v. 1, pp. 76-77, fig. 66.
  - Oviposition and food habits of Oncideres cingulata; figure of imago and of amputated twig.
- 477. [Walsh, B. D., and C. V. Riley.] An Ichneumon fly mistaken for a wasp. <Amer. Ent., December, 1868, v. 1, p. 77.
  - Review of paper in *Christian Advocate* on "The stiletto wasp"; *Pimpla* [= Thalessa] atrata probably mistaken for a wasp.
- 478. [Walsh, B. D., and C. V. Riley.] A plant growing out of an insect. <Amer. Ent., December, 1868, v. 1, p. 77.
  - See Nos. 332, 403, 436; extract from Sedalia Press, with comments; larvæ of Lachnosterna fusca infested with Cordyceps; larvæ supposed to have eaten poisonous seed, which has germinated after killing the larvæ; sowing the seed as a means against the larvæ.
- 479. [Walsh, B. D., and C. V. Riley.] On our table. <Amer. Ent., December, 1868, v. 1, p. 78.
  - Notices of The butterflies of North America by W. H. Edwards.—The Canadian Entomologist.—Guide to the study of insects by A. S. Packard, jr.
- 480. [Walsh, B. D., and C. V. Riley.] Eggs of the white-marked tussock moth. <Amer. Ent., December, 1868, v. 1, p. 79, fig. 67.
  - Answer to inquiry of J. M. Hannah; characters of egg and larva of Orgyia leucostigma; sexual differences; parasites; figure of the larva.
- 481..[WALSH, B. D., and C. V. RILEY.] Currant borers. < Amer. Ent., December, 1868, v. 1, p. 79.
  - Inswer to inquiry of B. N. McKinstry; means against Trochilium [= Egeria] tipuliformis, T. [= Alcathæ] caudatum, and <math>Psenocerus supernotatus.

- 482. [Walsh, B. D., and C. V. Riley.] Insect infesting grape seed. <Amer. Ent., December, 1868, v. 1, p. 79, fig. 68.
  - Answer to inquiry of A. S. Fuller; characters and figure of larva of *Isosoma* vitis infesting grape seed.
- 483. [Walsh, B. D., and C. V. Riley.] Museum pests again. <Amer. Ent., December, 1868, v. 1, p. 79.
  - Answer to inquiry of J. Huggins; means against Anthreui in collections of natural history.
- 484. [Walsh, B. D., and C. V. Riley.] Grape-vine leaf-hoppers. <a href="#"><Amer. Ent., December, 1868, v. 1, p. 79</a>.
  - Answer to inquiry of P. C. Holmes; means against grape-vine leaf-hoppers.
- 485. [Walsh, B. D., and C. V. Riley.] Apple-tree borer. <Amer. Ent., December, 1868, v. 1, p. 80, fig. 69.

  Answer to inquiries of J. T. Zimmerman, C. H. Roberts, and C. R. Babbitt:
  - habits, ravages, and figure of Bostrichus [= Amphicerus] bicaudatus.
- 486. [Walsh, B. D., and C. V. Riley.] The murky ground beetle. <Amer. Ent., December, 1868, v. 1, p. 80.

  Answer to inquiry of E. T. Dale; fcod-habits and bombardier discharges of
  - Answer to inquiry of E. T. Dale; food-habits and bombardier discharges of Harpalus caliginosus.
- 487. [Walsh, B. D., and C. V. Riley.] Curculio and bark-lice. <a href="https://example.com/Amer.ent.">Amer. Ent., December, 1868, v. 1, p. 80.</a>
  - Answer to inquiry of D. A. Compton; hibernation of Conotrachelus nenuphar; soft soap as a means against Coccidæ.
- 488. [Walsh, B. D., and C. V. Riley.] Insects to be named. <Amer. Ent., December, 1868, v. 1, p. 80.
  - Answer to inquiry of E. B. Beach; identification of several lepidopterous larvæ; food-habits of *Dryocampa stigma* and *D. pellucida* [= virginiensis].
- 489. [Walsh, B. D., and C. V. Riley.] Young pecan trees girdled. Amer. Ent., December, 1868, v. 1, p. 80.
  - Answer to inquiry of Mann and Redmond; means against Oncideres cingulata.
- 490. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., December, 1868, v. 1, p. 80.
  - Answer to inquiry of E. T. Dale; identification of several Coleoptera; supposed food-habits of *Tragidion fulvipenne*; character of cocoons of two species of *Microgaster* infesting *Protoparce celeus*.
- 491. [Walsh, B. D., and C. V. Riley.] Eggs of true bugs. <Amer. Ent., December, 1868, v. 1, p. 80.
  - Answer to inquiry of S. C. Thornton; characters of eggs of *Prionidus cristatus*. See Amer. Ent., v. 1, pp. 96 and 187.
- 492. [Walsh, B. D., and C. V. Riley.] Museum pest once more. <a href="#"><Amer. Ent.</a>, December, 1868, v. 1, p. 80.
  - Answer to inquiry of G. M. L.; larvæ of Anthrenus musworum injuring whalebone, woolen goods, etc.
- 493. [Walsh, B. D., and C. V. Riley.] The Tarantula of Texas again. <Amer. Ent., December, 1868, v. 1, p. 80.
  - Answer to inquiry of C. Peabody; distribution of Mygale hentzii in Missouri.

- 494. [Walsh, B. D., and C. V. Riley.] The Hessian fly on seed wheat. < Amer. Ent., December, 1868, v. 1, p. 80.
  - Answer to inquiry of U. Scott; broods and times of transformation of Cecidomyia destructor.
- 495. [Walsh, B. D., and C. V. Riley.] The apple-root plant-louse. Eriosoma (Pemphigus) pyri, Fitch. <Amer. Ent., January, 1869, v. 1, pp. 81–84, figs. 70–72.
  - Habits, ravages, description, enemies, and parasites of, and means against Eriosoma pyri [=Schizoncura lanigera]; figures injured root, larva, and adult with details of structure; figures adult plant-louse found on cottonwood; description and figure of larva, puparium, and image of Pipiza radicum n. sp.
- 496. [Walsh, B. D., and C. V. Riley.] Ants' nests in gardens. <a href="mailto:</a> <a href="mailto:Amer. Ent.">Ants' nests in gardens. <
- 497. [Walsh, B. D., and C. V. Riley.] The parasites of the human animal. <Amer. Ent., January, 1869, v. 1, pp. 84-88, figs. 73-74.
  - Brief accounts of Pediculus humanus [= vestimenti], P. cervicalis [= capitis], P. [= Pthirius] pubis, Estrus [= Dermatobia] hominis, Pulex irritans, P. [= Sarcopsylla] penetrans, Acanthia lectularia, Conorhinus sanguisuga, and Acarus [= Sarcoptes] scabiei; figures and habits of Reduvius [= Opsicatus] personatus and of Pirates [= Rasahus] biguttatus; figure of Conorhinus sanguisuga; classificatory relations of Pediculina and Mallophaga.
- 498. [Walsh, B. D., and C. V. Riley.] The coffee borer. <Amer. Ent., January, 1869, v. 1, p. 88.
  Unnamed coffee borer injurious to coffee trees in Madras.
- 499. [Walsh, B. D., and C. V. Riley.] Strawberry worms. < Amer. Ent., January, 1869, v. 1, pp. 89-91, figs. 75-76.
  - Description, natural history, ravages, means against, and figures of larva and imago of Anchylopera [= Phoxopteris] fragariae, n. sp.; figures all stages of Emphytus [= Harpiphorus] maculatus; description of its larva and pupa, its natural history, and means against its ravages.
- 500. [Walsh, B. D., and C. V. Riley.] Fungoid growths. < Amer. Ent., January, 1869, v. 1, pp. 91-92.
  - Mention of instances of the growth of fungi on living plants and animals; letter of S. H. Y. Early on the occurrence of fungoid growths on the larvæ of *Lachnosterna fusca*.
- 501. [Walsh, B. D., and C. V. Riley.] Plums for the million. <Amer. Ent., January, 1869, v. 1, pp. 92-93.
  - Means against Conotrachelus nanuphar; notes on varieties of plum exempt from the attacks of the same.
- 502. [Walsh, B. D., and C. V. Riley.] The "Colorado grasshopper." <Amer. Ent., January, 1869, v. 1, pp. 95-96.
  - Answer to inquiries of W. N. Byers and V. Devinny; specific names indicating particular districts can not be changed because the insect is found in other regions.

- 503. [Walsh, B. D., and C. V. Riley.] Universal remedies. < Amer. Ent., January, 1869, v. 1, p. 97.
  - Criticism of an advertisement of "Best's patent fruit tree and vine invigorator."
- 504. [Walsh, B. D., and C. V. Riley.] Complimentary. < Amer. Ent., January, 1869, v. 1, p. 98. Notices of several notices of the American Entomologist.
- 505. [Walsh, B. D., and C. V. Riley.] Paper-makers. <Amer. Ent., January, 1869, v. 1, p. 98.

Comparison of the manufacture of paper by man and by the Vespidæ.

- 506. [Walsh, B. D., and C. V. Riley.] On our table. <Amer. Ent., January, 1869, v. 1, p. 98. Notices of L'Insectologie agricole—Cecil's books of natural history.
- 507. [Walsh, B. D., and C. V. Riley.] Look out for the eggs of the apple-tree plant-louse. < Amer. Ent., January, 1869, v. 1, p. 99. Abundance of eggs of Aphis mali in winter of 1868-'69, in Missouri and Illinois; means against the same.
- 508. [Walsh, B. D., and C. V. Riley.] Greenhouse plants [= pests]. <a href="#"><Amer. Ent., January, 1869, v. 1, p. 99.</a> Means against Aphididæ, Coccidæ, and Tetranychus telarius.
- 509. [Walsh, B. D., and C. V. Riley.] How to hatch pupe. < Amer. Ent., January, 1869, v. 1, p. 99. Answer to inquiry of D. P. Smith; methods of raising insects.
- 510. [Walsh, B. D., and C. V. Riley.] Drug-store pests. Ent., January, 1869, v. 1, p. 99. Answer to inquiry of J. M. Good; characters of larva of undertermined
  - ptinid; food-habits of Ptinus brunneus; food-habits, characters, and means against Calandra oryzæ and C. granaria. (See No. 551.)
- 511. [Walsh, B. D., and C. V. Riley.] Apple-tree worms. <Amer. Ent., January, 1869, v. 1, p. 99.
  - Answer to inquiry of J. J. Thomas; habits, food-plants, and means against  $Phycita\ nebulo\ [=Acrobasis\ indiginella].$
- 512. [Walsh, B. D., and C. V. Riley.] Crane-fly larve. Amer. Ent., January, 1869, v. 1, p. 100.
  - Answer to inquiries of R. D. Alexander and Hickman; habits of Tipula sp.; food-habits of T. trivittata.
- 513. [Walsh, B. D., and C. V. Riley.] Punctured grape canes. <Amer. Ent., January, 1869, v. 1, p. 100.
  - Answer to inquiry of B. L. Kingsbury; description of punctures in grape canes probably caused by Orocharis saltator; means against tree-crickets.
- 514. [Walsh, B. D., and C. V. Riley.] Insects to be named. < Amer. Ent., January, 1869, v. 1, p. 100.
  - Answer to inquiry of W. R. Marine; identification of several insects found in apple and peach nurseries.
- 515. [Walsh, B. D., and C. V. Riley.] Supposed cause of yellows in peach trees. < Amer. Ent., January, 1869, v. 1, p. 100, fig. 77. Answer to inquiry of C. H. Roberts; yellows of peach-trees a vegetable dis-

ease; figure of healthy and diseased limb; affected trees more subject to

the attacks of insects than healthy trees.

- 516. [WALSH, B. D., and C. V. RILEY.] Eggs of katydid. < Amer. Ent., January, 1869, v. 1, p. 100.
  - Answer to inquiry of A. A. Hilliard; character of the eggs of *Platyphyllum* [= Cyrtophyllus] concavus.
- 517. [Walsh, B. D., and C. V. Riley.] Apple-twig borer. <Amer. Ent., January, 1869, v. 1, p. 100.
  - Answer to inquiry of J. T. Zimmerman; ravages of Bostrichus [= Amphicerus] bicaudatus.
- 518. [Walsh, B. D., and C. V. Riley.] Galls and their architects. <Amer. Ent., February, 1869, v. 1, pp. 101-110, figs. 78-90.
  - Definition, classification, and variation of galls; accounts of some galls made by Cynipidæ, Cecidomyidæ, and Aphididæ and of the gall-makers; natural history, descriptions, and figures of Cynips [= Amphibolips] q.-spongifica, C. [= A.] q.-inanis, C. [= A.] q.-prunus n. sp., Cecidomyia s.-strobiloides, C. s.-brassicoides, C. v.-pomum n. sp., C. v.-coryloides n. sp., Pemphigus vagabundus, P. rhois and Colopha ulmicola; description of the image of Cynips q.-prunus and of Pemphigus ulmifusus n. sp., and of the larvæ of the new species of Cecidomyia; dimorphism of gall-makers; presence of inquilines and parasites in galls. (See No. 821.)
- 519. [Walsh, B. D., and C. V. Riley.] The bogus Colorado potatobug, Doryphora juncta, Germar. <Amer. Ent., February, 1869, v. 1, p. 110.

Food-habits of D. juncta.

- 520. [Walsh, B. D., and C. V. Riley.] Ants and aphides. <Amer. Ent., February, 1869, v. 1, p. 110.
  - Inquiry of W. Batchelor, with answer; secretion of honey-dew by Aphidida and harvesting of the same by ants.
- 521. [WALSH, B. D., and C. V. RILEY.] The Tarantula of Texas, Mygale hentzii, Girard. <Amer. Ent., February, 1869, v. 1, p. 11, fig. 91.
  - Figure of Mygale hentzii: habits of Pompilus [=Pepsis] formosa; quotes from G. Lincecum's "The Tarantula killers of Texas" (Amer. Nat., v. 1, pp. 137-141).
- 522. [Walsh, B. D., and C. V. Riley.] The melancholy chafer. <a href="#"><Amer. Ent.</a>, February, 1869, v. 1, p. 111.
  - Ravages and figure of the imago of Euphoria melancholica.
- 523. [Walsh, B. D., and C. V. Riley.] Apple worms (Carpocapsa pomonella, Linn.). <Amer. Ent., February, 1869, v. 1, pp. 112–114, fig. 93.
  - Natural history, ravages, and means against Carpocapsa pomonella; figures injured apple, larva, pupa, and imago.
- 524. [Walsh, B. D., and C. V. Riley.] The asparagus beetle (*Crioceris asparagi*, Linn.). <Amer. Ent., February, 1869, v. 1, pp. 114-115, fig. 94.
  - Introduction into the United States; natural history, ravages, parasites of, and means against *Crioceris asparagi*; figure of eggs, larvæ, and imago of the same.

- 525. [WALSH, B. D., and C. W. RILEY.] A popular delusion. < Amer. Ent., February, 1869, v. 1, p. 116.
  - No insect passes through all the stages of its growth within one day; life history of *Ephemeridæ*.
- 526. [Walsh, B. D., and C. V. Riley.] The squirrel bot. < Amer. Ent., February, 1869, v. 1, v. 117.
  - Comments on paper by S. S. Rathvon; emasculation of the striped squirrel by Cuterebra buccata.
- 527. [Walsh, B. D., and C. V. Riley.] [Periodical Cicada.] < Amer. Ent., February, 1869, v. 1, p. 117.
  - Comments on letter of R. H. Warder; oviposition of Cicada [= Tibicen] septendecim in evergreens.
- 528. [Walsh, B. D., and C. V. Riley.] Transformations of insects. <Amer. Ent., February, 1869, v. 1, p. 118.

  Brief statement of the stages of growth of insects.
- 529. [Walsh, B. D., and C. V. Riley.] Do bees injure raspberries? < Amer. Ent., February, 1869, v. 1, p. 118.
  - Comments on discussion before New York Fruit Growers' Club as to the effects of bees on flowers and fruits.
- 530. [Walsh, B. D., and C. V. Riley.] Best's fruit-tree invigorator again. <Amer. Ent., February, 1869, v. 1, p. 119.

  Notice of invention of a new "invigorator" by B. Best.
- 531. [WALSH, B. D., and C. V. RILEY.] The insect extinguisher, by Joseph Treat, N. J. < Amer. Ent., February, 1869, v. 1, p. 119. Critical review of pamphlet by J. Treat.
- 532. [Walsh, B. D., and C. V. Riley.] More good words. <Amer. Ent., February, 1869, v. 1, p. 119.

  Notice of favorable notices of the American Entomologist.
- 533. [Walsh, B. D., and C. V. Riley.] Lacewing fly. < Amer. Ent., February, 1869, v. 1, p. 119.
  - Answer to inquiry of J. Huggins; characters of Chrysopa sp.; its hibernation as a pupa and imago.
- 534. [Walsh, B. D., and C. V. Riley.] Gigantic water-bug. < Amer. Ent., February, 1869, v. 1, p. 119.
  - Answer to inquiry of S. E. Munford; food-habits of Belostoma grandis [=americanum].
- 535. [Walsh, B. D., and C. V. Riley.] The white-marked tussock moth again. <Amer. Ent., February, 1869, v. 1, p. 120.
  - Answer to inquiry of A. S. Fuller; mention of seven parasites attacking Orgyia leucostigma.
- 536. [Walsh, B. D., and C. V. Riley.] Grasshopper eggs—will they hatch? <Amer. Ent., February, 1869, v. 1, p. 120.
  - Answer to inquiry of C. J. Jones; frosts not likely to prevent the hatching of the eggs of Caloptenus spretus.
- 537. [Walsh, B. D., and C. V. Riley.] Injured apple-trees. < Amer. Ent., February, 1869, v. 1, p. 120.
  - Answer to inquiry of G. C. Broadhead; means against Chrysobothris femorata,

- 539. [Walsh, B. D., and C. V. Riley.] Bag worms. <Amer. Ent., February, 1869, v. 1, p. 120.
  - Answer to inquiry of W. W. Butterfield; means against Thyridopteryx ephemerwformis.
- 539. [Walsh, B. D., and C. V. Riley.] Eggs of the apple-tree plant-louse. <Amer. Ent., February, 1869, v. 1, p. 120.
  - Answer to inquiry of M. W. Seaman; effect of flosts upon the eggs and larvæ of Aphis mali.
- 540. [Walsh, B. D., and C. V. Riley.] Insects named. <Amer Ent., February, 1869, v. 1, p. 120.
  - Answer to inquiry of J. B. Merwin; identification of insects sent; characters of Vanessa antiopa and Cynthia [=Pyrameis] atalanta.
- 541. [Walsh, B. D., and C. V. Riley.] White grubs. < Amer. Ent., February, 1869, v. 1, p. 120.
  - Answer to inquiry of W. C. Holmes; undetermined white-grub injuring grass and osage orange.
- 542. [Walsh, B. D., and C. V. Riley.] The polyphemus moth, Attacus polyphemus, Linn. <Amer. Ent., March, 1869, v. 1, pp. 121–122, fig. 95.
  - Attacus [= Tclea] polyphemus, A. cynthia, and Bombyx [= Sericaria] mori as silk-producers; food-plants, description of larva, habits, and seasons of A. [= T.] polyphemus; figure of the imago; ravages of A. ceropia; antennæ mistaken for wings; mention of Lepidoptera having fissured wings.
- 543. [Walsh, B. D., and C. V. Riley.] Wasps and their habits. <Amer. Ent., March, 1869, v. 1, pp. 122-143, figs. 96-112.
  - Structure, elassification, and habits of North American predatory Hymenoptera; comparative characters of the digger and truo wasps; figure to show the folding of the wing in truo wasps; habits and figures of images of Chlorion caruleum, Bembex fasciata, Sphex ichneumonea, Ammophila pictipennis, Pepsis formosa, Stizus grandis [=Sphecius speciosus], S. [=S.] speciosus, Pelopaus lunatus [=cementarius], Agenia bombycina, Trypoxylon albitarse, Ceropales rufiventris, Eumenes fraternus, Vespa maculata, and Polistes rubiginosus; figure of image of Cryptus [=Linoceras] junecus and of several nests of wasps. (See No. 375.)
- 544. [Walsh, B. D., and C. V. Riley.] Do toads eat worker bees? <Amer. Ent., March, 1869, v. 1, p. 144.
  - Reprint and review of article by C. Dadant, and of comments of editors of American Bee Journal; usefulness of toads.
- 545. [Walsh, B. D., and C. V. Riley.] Best's invigorator once again. <a href="mailto:Amer. Ent."><Amer. Ent.</a>, March, 1869, v. 1, p. 145.

Condemnation of B. Best's patent fruit tree and vine invigorator.

- 546. [Walsh, B. D., and C. V. Riley.] On our table. <Amer. Ent., March, 1869, v. 1, p. 146.
  - Notices of Nos. 1 and 2 of Le Naturaliste Canadien.
- 547. [Walsh, B. D., and C. V. Riley.] Sugar-tree borer. <Δmer. Ent., March, 1869, v. 1, p. 146.
  - Answer to inquiry of E. Simms; characters and means against Arhopalus [=Plagionotus] speciosus.

- 548. [Walsh, B. D., and C. V. Riley.] Swellings on apple scions. <a href="mailto:Amer.Ent.">Amer. Ent.</a>, March, 1869, v. 1, p. 146.
  - Answer to inquiry of W. Colwell; dipterous galls on apple scions and basswood twigs.
- 549. [Walsh, B. D., and C. V. Riley.] Gas-waste vs. Curculio. <Amer. Ent., March, 1869, v. 1, p. 147.
  - Answer to inquiry of H.; merits of gas-waste as an insect destroyer.
- 550. [Walsh, B. D., and C. V. Riley.] Eggs of the apple-tree plantlouse again. - < Amer. Ent., March, 1869, v. 1, p. 147. Answers to inquiries of C. Williams and W. L. French; means against *Aphis*

Answers to inquiries of C. Williams and W. L. French; means against *Aphis mali*.

- 551. [Walsh, B. D., and C. V. Riley.] Drug-store pests. < Amer. Ent., March, 1869, v. 1, p. 147.
  - Answer to inquiry of J. M. Good; food-habits of Lasioderma serricorne. See No. 510.
- 552. [Walsh, B. D., and C. V. Riley.] Small galls and minings on apple-twigs. <Amer. Eut., March, 1869, v. 1, p. 147.

  Answer to inquiry of O. O. A. Gardner; characters of undetermined galls

and borings in twigs of apple-trees.

- 553. [Walsh, B. D., and C. V. Riley.] Stinking bugs. < Amer. Ent., March, 1869, v. 1, p. 147.
  - Answer to inquiry of C. L. Janney; habits of an undescribed Brachyrhyn-chus.
- 554. [Walsh, B. D., and C. V. Riley.] Eggs in peach-twigs. < Amer. Ent., March, 1869, v. 1, p. 147.
  - Answer to inquiry of G. Fisher; character of eggs of Ecanthus niveus.
- 555. [Walsh, B. D., and C. V. Riley.] Flat-headed apple-tree borer. <a href="#"><a href="#">Amer. Ent.</a>, March, 1869, v. 1, p. 147.

  Answer to inquiry of B. F. Mudge; means against Chrysobothris femorata.
- 556. [Walsh, B. D., and C. V. Riley.] A bundle of entomological queries. <Amer. Ent., March, 1869, v. 1, p. 148.

Answer to inquiry of W. W. Butterfield; mentions several desirable entomotogical books.

557. [Walsh, B. D., and C. V. Riley.] Grape-berry moth. < Amer. Ent., March, 1869, v. i, p. 148.

Answer to inquiry of M. C. Read; means against *Penthina vitivorana* [= Eu-

demis botrana].

558. [Walsh, B. D., and C. V. Riley.] Hairy caterpillar. < Amer. Ent., March, 1869, v. 1, p. 148.

Answer to inquiry of T. S. Gold; characters of the larva and image of Arctia [=Pyrrharetia] isabella.

559. [Walsh, B. D., and C. V. Riley.] Borer in plum-twigs. < Amer. Ent., March, 1869, v. 1, p. 148.

Answer to inquiry of W. Caldwell; undetermined borer, allied to the oak-pruner, in plum-twigs. See No. 606.

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- 560. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., March, 1869, v. 1, p. 148.
  - Answer to inquiry of W. W. Butterfield; identification of insects sent; comparative characters of Arhopalus [= Cyllene] pictus and A. [= C.] robiniæ; variation in Clytus [= Neoclytus] capræa; generic characters of Arhopalus and Clytus. (See No. 582.)
- 561. [Walsh, B. D., and C. V. Riley.] Pear-root borer. < Amer. Ent., March, 1869, v. 1, p. 148.
  - Answer to inquiry of P. Earle; larva of Prionus laticallis injurious to the pear and grape.
- 562. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., March, 1869, v. 1, p. 148.
  - Answer to inquiry of M. H. Boye; Gryllotalpa longipennis [= columbia] a dimorphic form of G. borealis.
- 563. [WALSH, B. D., and C. V. RILEY.] The joint-worm (*Isosoma hordei* Harris). <Amer. Ent., April, 1869, v. 1, pp. 149-158, figs. 113-118.
  - Natural history, variation, parasites, ravages, and means against *Isosoma hordei*; unity of habits in insects; generic classification of the joint-worm fly; figures male and female imago; figures  $\mathcal{E}$  and  $\mathcal{Q}$  imagos of *Semiotellus chalcidiphagus* n. sp., *Eurytoma* sp., and *Decatoma* sp., and of  $\mathcal{Q}$  imago of *Antigaster* [=*Eupelmus*] *mirabilis*.
- 564. [Walsh, B. D., and C. V. Riley.] The wavy-striped flea-beetle. (Haltica [Phyllotreta] striolata Illiger). <Amer. Ent., April, 1869, v. 1, pp. 158-159, fig. 119.
  - Description, habits, and ravages of *Phyllotreta striolata* [=vittata]; figures larva, pupa, and imago of the same; quotes from H. Shimer's "The wavy-striped flea-beetle" (Amer. Nat., December, 1868, v. 2, pp. 514-517).
- 565. [Walsh, B. D., and C. V. Riley.] Concerning certain smart bugs. <Amer. Ent., April, 1869, v. 1, p. 160.
  - Preferences of Phylloxera vitifolia [=vastatrix] and Macrodactylus subspinosus for certain varieties of grape-vines, of Doryphora 10-lineata and Lema trilineata for certain varieties of potato-vines, and of Mytilaspis pomicorticis [=pomorum] and Carpocapsa pomonella for certain varieties of apple.
- 566. [Walsh, B. D., and C. V. Riley.] Curculio remedies. < Amer. Ent., April, 1869, v. 1, p. 161.
  - Comments on essay of L. C. Francis on the plum; coal oil not effective against Conotrachelus nenuphar.
- 567. [Walsh, B. D., and C. V. Riley.] How great wits jump together. <a href="#"><Amer. Ent.</a>, April, 1869, v. 1, p. 161.
  - Stopping holes with hard soap ineffective against borers.
- 568. [Walsh, B. D., and C. V. Riley.] On our table. <Amer. Ent., April, 1869, v. 1, p. 165.
  - Notices of Harris's Insects injurious to Vegetation, L'Insectologie agricole, and several other works not entomological.

- 569. [Walsh, B. D., and C. V. Riley.] Eggs of the oblong-winged katydid. <Amer. Ent., April, 1869, v. 1, p. 166, fig. 120.
  - Answer to inquiries of T. A. Thop, J. L. Rice, B. J. Campbell, H. Cheeney, and A. McMoore; eggs of *Phylloptera* [= Amblycorypha] oblongifolia compared with those of *Platyphyllum* [= Cyrtophyllus] concavum; figures of the eggs of A. oblongifolia.
- 570. [Walsh, B. D., and C. V. Riley.] Mossy rose gall. <Amer. Ent., April, 1869, v. 1, p. 166.
  - Answer to inquiry of F. W. Collins; characters of Rhodites rosæ and its gall.
- 571. [Walsh, B. D., and C. V. Riley.] Caterpillars on lombardy poplars. <Amer. Ent., April, 1869, v. 1, p. 166.
  - Answer to inquiry of J. F. Gurley; characters of larva, habits, food-plants, and parasites of Acronycta accricola [= americana].
- 572. [WALSH, B. D., and C. V. RILEY.] Museum pests. < Amer. Ent., April, 1869, v. 1, p. 166, fig. 121.
  - Answer to inquiries of F. W. Hoit, jr., G. M. L., and J. Huggins; figures larva, pupa, and imago of Anthrenus sp.; A. varius compared with A. museorum.
- 573. [Walsh, B. D., and C. V. Riley.] Cockroach eggs. < Amer. Ent., April, 1869, v. 1, p. 166.
  - Answer to inquiry of H. C. Freeman; character of the egg-cases and adult of *Platamodes unicolor*; occurrence of *Ectobia germanica* in Illinois; ravages of species of *Blattidæ*.
- 574. [Walsh, B. D., and C. V. Riley.] Apple-tree leaf-crumplers. <Amer. Ent., April, 1869, v. 1, p. 166.
  - Answer to inquiry of J. F. Jones; result of the work of the larvæ of *Phycita* nebulo [= Acrobasis indiginella] on the growth of apple-trees.
- 575. [Walsh, B. D., and C. V. Riley.] A most precious bug. <Amer. Ent., April, 1869, v. 1, p. 167.
  - Answer to inquiry of E. S. Holmes; characters and variety of Hylecætus lugubris; destructiveness of Lymexylon navale; use of the maxillary palpi in the 3 3 of Lymexylidæ.
- 576. [Walsh, B. D., and C. V. Riley.] Blackberry-cane borers. <Amer. Ent., April, 1869, v. 1, p. 167.
  - Answer to inquiry of C. Parry; characters and habits of larva of unnamed borer [= Bembecia marginata]; plants affected by species of Ægeriadæ.
- 577. [Walsh, B. D., and C. V. Riley.] Rows of eggs in pear-twigs. <Amer. Ent., April, 1869, v. 1, p. 167.
  - Answer to inquiry of H. C. Freeman; characters of unknown eggs found in pear-twigs.
- 578. [Walsh, B. D., and C. V. Riley.] An orchard giving out. <Amer. Ent., April, 1869, v. 1, p. 168.
  - Answer to inquiry of W. M. Clemens; habits and means against Saperda bivittata [= candida] and Chrysobothris femorata.
- 579. [Walsh, B. D., and C. V. Riley.] Plant-louse eggs on apple and mountain ash. <Amer. Ent., April, 1869, v. 1, p. 168.
  - Answer to inquiry of W. Stewart; eggs of Aphis mali on apple-twigs and probably on those of mountain ash; Aspidiotus harrisii [= Chionaspis furfurus] infests both trees.

- 580. [Walsh, B. D., and C. V. Riley.] Gigantic rhinoceros beetle. <Amer. Ent., April, 1869, v. 1, p. 168.
  - Answer to inquiry of F. G. Smith; characters of Dynastes tityrus.
- 581. [Walsh, B. D., and C. V. Riley.] Bee queries. <Amer. Ent., April, 1869, v. 1, p. 168.
  - Answer to inquiry of W. R. Howard; Galleria cereana always injurious; a new swarm composed of both old and new bees.
- 582. [Walsh, B. D., and C. V. Riley.] Insects named. <Amer. Ent., April, 1869, v. 1, p. 168.
  - Answer to inquiry of W. W. Butterfield; characters of Clytus [=Neoclytus] capræa. (See No. 560.)
- 583. [Walsh, B. D., and C. V. Riley.] Elm-tree borer. <Amer. Ent., April, 1869, v. 1, p. 168.
  - Answer to inquiry of W. M. Gregory; Saperda lateralis and Dryobius serfasciatus attack the elm in the larva state. (See No. 696.)
- 584. [Walsh, B. D., and C. V. Riley.] The chinch-bug (*Micropus leucopterus* Say). <Amer. Ent., 1869, v. 1, May, pp. 169-177, fig. 122; June, pp. 194-199, figs. 135-139. Reprint: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 15-37, figs. 1-10. See No. 1127 for synopsis of contents.
- 585. [Walsh, B. D., and C. V. Riley.] The grape-berry moth (*Penthina vitivorana*, Packard). <Amer. Ent., May, 1869, v. 1, pp. 177–179, figs. 123–125.
  - Natural history, ravages, and means against Penthina vitivorana [= Eudemis botrana]; figures, larva, pupa, eocoon, imago, and injured grape.
- 586. [Walsh, B. D., and C. V. Riley.] Poisonous flour. <Amer. Ent., May, 1869, v. 1, p. 179.
  - Application of the term weevil; vesicatory properties of Sitophilus [= Calandra] granaria; poisonous nature of flour made from wheat infested by these insects.
- 587. [WALSH, B. D., and C. V. RILEY.] Mounding peach trees. < Amer. Ent., May, 1869, v. 1, pp. 180–181, fig. 126.
  - Mounding as a means against Sannina exitiosa; figures  $\mathcal{J}$  and  $\mathcal{Q}$  of the same.
- 588. [Walsh, B. D., and C. V. Riley.] Going it blind. <Amer. Ent., May, 1869, v. 1, pp. 182-183.

  Remarks on the failure of persons to observe correctly.
- 589. [Walsh, B. D., and C. V. Riley.] Another new Curculio humbug. <Amer. Ent., May, 1869, v. 1, p. 183.
  - Extract from "agricultural paper," with comments on proposed means against Conotrachelus nenuphar.
- 590. [Walsh, B. D., and C. V. Riley.] Rear-horses vs. grasshoppers. <Amer. Ent., May, 1869, v. 1, p. 184, figs. 127-128.
  - Vernaeular names of Mantis = Phasmomantis carolina; its usefulness; figures of eggs and g and g imago.
- 591. [Walsh, B. D., and C. V. Riley.] Apple tree plant-lice. (Aphis mali, Linn.) < Amer. Ent., May, 1869, v. 1, p. 184.
  - Abundance of Aphis mali in several localities; its comparative harmlessness; means against it.

- 592. [Walsh, B. D., and C. V. Riley.] Crack-jaw names. < Amer. Ent., May, 1869, v. 1, p. 184.
  - Combination of vernacular and technical names for the accommodation of different classes of readers.
- 593. [WALSH, B. D., and C. V. RILEY.] Send plenty of specimens. <Amer. Ent., May, 1869, v. 1, p. 185.

  Reasons why several specimens of insects should be sent for examination.
- 594. [Walsh, B. D., and C. V. Riley.] White-grub fungus. < Amer. Ent., May, 1869, v. 1, p. 186, fig. 129.
  - Answer to inquiries of J. Smith and of T. J. Freeman; larva of Lachnosterna fusca infested with Cordyceps ravenelii; figure of infested larva.
- 595. [Walsh, B. D., and C. V. Riley.] "Buck fly." <Amer. Ent., May, 1869, v. 1, p. 186.
  - Answer to inquiry of G. W. Copley; characters of larva and image of Saturnia [= Hemileuca] maia; food-plants of the larva.
- 596. [Walsh, B. D., and C. V. Riley.] Swarms of minute flies in rooms. <Amer. Ent., May, 1869, v. 1, p. 186.

  Answer to inquiry of S. S. Rathvon; habitat of larva of *Sciara* sp.
- 597. [WALSH, B. D., and C. V. RILEY.] Worms in osage orange seed. <Amer. Ent., May, 1869, v. 1, p. 186.

  Answer to inquiry of A. Plant; habits of the larva of an undetermined dip-
- teron found among osage orange seed.

  598. [Walsh, B. D., and C. V. Riley.] Insects to be named. <Amer. Ent., May, 1869, v. 1, p. 186.
  - Answer to inquiry of X. Q. Z.; value of names to a collection of insects.
- 599. [Walsh, B. D., and C. V. Riley.] The spotted lady-bird. < Amer. Ent., May, 1869, v. 1, p. 186, fig. 130.
  - Answer to inquiry of R. Seevers; value of *Hippodamia* [= Megilla] maculata as a destroyer of noxious insects; figure of the same.
- 600. [Walsh, B. D., and C. V. Riley.] Eggs of the white-marked tussock moth. < Amer. Ent., May, 1869, v. 1, p. 186.
  - Answer to inquiry of S. G. Knight; characters of eggs of Orgyia leucostigma.
- 601. [Walsh, B. D., and C. V. Riley.] Owl's pellets. <Amer. Ent., May, 1869, v. 1, p. 187.
  - Answer to inquiry of C. H. G.; presence of injurious insects in the pellets disgorged by owls [= hawks]. See No. 643.
- 602. [Walsh, B. D., and C. V. Riley.] Crab-apple borers. < Amer. Ent., May, 1869, v. 1, p. 187.
  - Answer to inquiry of J. Huggins; characters of undetermined lepidopterous borer infesting crab-apple trees.
- 603. [Walsh, B. D., and C. V. Riley.] Mosquitoes. <Amer. Ent., May, 1869, v. 1, p. 187.
  - Answer to inquiry of A. M. Abbott; life-habits of Culicida; benefits derived from the same.
- 604. [Walsh, B. D., and C. V. Riley.] Large silken cocoon. < Amer. Ent., May, 1869, v. 1, p. 187.
  - Answer to inquiry of W. W. Butterfield; food-habits of Attacus promethea.

- 605. [Walsh, B. D., and C. V. Riley.] Bugs in alcohol. <Amer. Ent., May, 1869, v. 1, p. 187.
  - Answer to inquiry of D. P. Smith; alcohol as a means of preserving insects.
- 606. [Walsh, B. D., and C. V. Riley.] Borer in plum-twig. <Amer. Ent., May, 1869, v. 1, p. 187.
  - Answer to inquiry of W. Colwell; *Elaphidion parallelum* [=villosum] bred from plum-twigs; it does not prune the twig. See No. 559.
- 607. [Walsh, B. D., and C. V. Riley.] Eggs of cut-worm moth. <Amer. Ent., May, 1869, v. 1, p. 188, fig. 131.
  - Answer to inquiries of G. Pauls, T. A. Thorp, and E. S. Foster; characters and figure of eggs of *Agrotis inermis* [=saucia]; characters and habits of the larva.
- 608. [Walsh, B. D., and C. V. Riley.] Snow fleas. <Amer. Ent., May, 1869, v. 1, p. 188.
  - Answer to inquiry of H. H. G. Bradt; habits and food of *Podura* [= Achorutes] nivicola.
- 609. [Walsh, B. D., and C. V. Riley.] Fuzzy galls on blackberry-twigs. <Amer. Ent., May, 1869, v. 1, p. 188.
  - Answer to inquiry of J. Huggins; characters of Diastrophus cuscutæformis and its gall.
- 610. [Walsh, B. D., and C. V. Riley.] Pithy galls on blackberry-twigs. <Amer. Ent., May, 1869, v. 1, p. 188.
  - Answer to inquiry of T. W. Gordon; characters of the gall made by Diastro-phus ncbulosus.
- 611. [Walsh, B. D., and C. V. Riley.] Moth eggs. <Amer. Ent., May, 1869, v. 1, p. 188.
  - Answer to inquiries of A. M. Shute and of J. Huggins; characters f the eggs of an undetermined moth.
- 612. [Walsh, B. D., and C. V. Riley.] Horse-hair snakes. < Amer. Ent., May, 1869, v. 1, p. 188.
  - Answer to inquiry of A. M. Abbott; characters and habitats of Gordiacea.
- 613. [WALSH, B. D., and C. V. RILEY.] Imitative butterflies. <Amer. Ent., June, 1869, v. 1, pp. 189-193, figs. 132-134.
  - Immunity of Danaidæ from and liability of Pieridæ to the attacks of predatory animals; mimiery of Danaidæ by Pieridæ and of Danais archippus by Limenitis disippus; hibernating habits and description of the larva of the latter, with figures of its larva, chrysalis, imago, and hibernaculum; figure of Danais archippus; theory of the origin of mimicry.
- 614. [Walsh, B. D., and C. V. Riley.] Cabbage-worms upon gilly-flowers. <Amer. Ent., June, 1869, v. 1, p. 199.
  - Habits and food-plants, seasons, and synonyms of Plutella cruciferarum.
- 615. [Walsh, B. D., and C. V. Riley.] "Wasps and their habits." <Amer. Ent., June, 1869, v. 1, p. 200.
  - Comments on letter of S. S. Rathvon; species having essentially different habits though externally indistinguishable should be considered specifically distinct.
- 616. [Walsh, B. D., and C. V. Riley.] The social wasps. < Amer. Ent., June, 1869, v. 1, p. 201.
  - Comments on paper by D. A. A. Nichols; habits of Vespa crabro.

- 617. [WALSH, B. D., and C. V. RILEY.] Mounding peach-trees. < Amer. Ent., June, 1869, v. 1, pp. 201–202.
  - Comments on letter of R. L. Wells; success of the mounding system against *Ægeria* [= Sannina] exitiosa.
- 618. [Walsh, B. D., and C. V. Riley.] Out of evil there cometh good. <Amer. Ent., June, 1869, v. 1, p. 202.
  - Probable abundance of the fruit crop in southern Illinois and in Missouri in 1869 due to the pruning of the trees by *Tibicen septendecim* in 1868.
- 619. [Walsh, B. D., and C. V. Riley.] The periodical Cicada. < Amer. Ent., June, 1869, v. 1, p. 202.
  - Extract from No. 474; request for information of the appearance of *Cicada* [= *Tibicen*] septendecim in any part of the United States in 1869.
- 620. [WALSH, B. D., and C. V. RILEY.] The Curculio scarcer than last year. <Amer. Ent., June, 1869, v. 1, p. 202.

  Extract from letter of A. M. Brown: comparative scarceity of Constructions.
  - Extract from letter of A. M. Brown; comparative scarcity of Conotrachelus nenuphar in 1869.
- 621. [Walsh, B. D., and C. V. Riley.] The American Entomological Society. <Amer. Ent., June, 1869, v. 1, p. 203.
  - Notice of the formation, publications, aims, and needs of the American Entomological Society; proposition for the raising of a fund for the support of the society.
- 622. [Walsh, B. D., and C. V. Riley.] Remarkable peculiarity in the insect world. <Amer. Ent., June, 1869, v. 1, p. 204.
  - Insects contrasted with animals of other groups; as a rule they produce but one brood of offspring in the course of their lives.
- 623. [Walsh, B. D., and C. V. Riley.] On our table. <Amer. Ent., June, 1869, v. 1, pp. 204-205.
  - Notices of: The Harris correspondence; The butterflies of North America, by W. H. Edwards; Guide to the study of insects, by A. S. Packard, jr.
- 624. [Walsh, B. D., and C. V. Riley.] Cannibal mites. < Amer. Ent., June, 1869, v. 1, p. 205.
  - Answer to inquiry of C. S. Davis; *Trombidium* sp. found preying on grass-hopper eggs.
- 625. [Walsh, B. D., and C. V. Riley.] Gnats. <Amer. Ent., June, 1869, v. 1, p. 205.
  - Answer to inquiry of W. O. Hiskey; distinctive characters of Culex and Chironomus; appearance of "clouds" of Chironomus.
- 626. [Walsh, B. D., and C. V. Riley.] Cut-worms severing cabbage plants. <Amer. Ent., June, 1869, v. 1, p. 205.
  - Answer to inquiry of N. C. Burch; characters of the larva of Agrotis telifera [= ypsilon].
- 627. [Walsh, B. D., and C. V. Riley.] Beetle named. <Amer. Ent., June, 1869, v. 1, p. 205.
  - Answer to inquiry of J. M. Shaffer; Anisodactylus baltimorensis flying in great numbers at Fairfield, Iowa.
- 628. [WALSH, B. D., and C. V. RILEY.] Tiger beetles. < Amer. Ent., June, 1869, v. 1, p. 205.
  - Answer to inquiry of J. M. Shaffer; habitat of Cicindela vulgaris.

- 629. [WALSH, B. D., and C. V. RILEY.] Cocoons and chrysalids named. < Amer. Ent., June, 1869, v. 1, p. 206.
  - Answer to inquiry of A. S. Fuller; characters of larva and image of Cerato-campa [= Citheronia] regalis; food-plants of its larva; characters of the cocoons of Attacus promethea, A. cecropia, A. [= Telea] polyphemus. and of Thyridopteryx ephemeræformis.
- 630. [Walsh, B. D., and C. V. Riley.] White-lined morning Sphinx. <Amer. Ent., June, 1869, v. 1, p. 206.
  - Answer to inquiry of S. Blanchard; characters, transformations, habits, and distribution of *Deilephila lineata*; food-plants of its larva.
- 631. [Walsh, B. D., and C. V. Riley.] Insects named. <Amer. Ent., June, 1869, v. 1, p. 206.
  - Answer to inquiry of W. W. Butterfield; identification of insects sent; differences between the spring and autumn broads of *Drasteria erechtea*.
- 632. [Walsh, B. D., and C. V. Riley.] Peach-twig borer. <Amer. Ent., June, 1869, v. 1, p. 206, fig. 140.
  - Answer to inquiry of W. Muir; characters, habits, and figure of the larva of Gortyna nitela.
- 633. [Walsh, B. D., and C. V. Riley.] The apple-twig borer. <Amer. Ent., June, 1869, v. 1, p. 206, fig. 141.
  - Answer to inquiry of A. Hinckley; habits, sexual differences, and figure of Bostrichus [= Amphicerus] bicaudatus.
- 634. [Walsh, B. D., and C. V. Riley.] Apple-tree borers on south side of trees. <Amer. Ent., June, 1869, v. 1, p. 206.
  - Answer to inquiry of J. F. Wielandy; preference shown for the south and southwest sides of trees by the larva of *Chrysobothris femorata*.
- 635. [Walsh, B. D., and C. V. Riley.] Cocoons of the Cecropia moth. <Amer. Ent., June, 1869, v. 1, p. 206.
  - Answer to inquiry of T. W. Gordon; comparison between the cocoons of *Telea polyphemus* and *Attacus cecropia*.
- 636. [Walsh, B. D., and C. V. Riley.] Flea-beetles. <Amer. Ent., June, 1869, v. 1, p. 206.
  - Answer to inquiry of F. Hecker; characters of an undescribed *Longitarsus* infesting wheat fields.
- 637. [Walsh, B. D., and C. V. Riley.] Strawberry bugs. <Amer. Ent., June, 1869, v. 1, p. 207.
  - Answer to inquiry of J. M. Pearson; characters, ravages, and means against Corimelana pulicaria.
- 638. [Walsh, B. D., and C. V. Riley.] Eggs on apple-trees. < Amer. Ent., June, 1869, v. 1, p. 207, fig. 142.
  - Answer to inquiry of H. Compton; characters of eggs of Sinea diadema; figure of the imago; its value as a destroyer of canker-worms.
- 639. [Walsh, B. D., and C. V. Riley.] Lady-bird larvæ. <Amer. Ent., June, 1869, v. 1, p. 207, fig. 143.
  - Answer to inquiry of E. S. Foster; characters of the larva of Hippodamia convergens; figures its larva, pupa, and imago; usefulness of Coccinellidæ.

- 640. [Walsh, B. D., and C. V. Riley.] White-grub fungus, again. <Amer. Ent., June, 1869, v. 1, p. 207, fig. 144.
  - Answer to inquiry of W. C. Holmes; figures larva of Lachnosterna fusca attacked by Cordyceps ravenelii.
- 641. [Walsh, B. D., and C. V. Riley.] Bag-worms. <Amer. Ent., June, 1869, v. 1, p. 207.
  - Answer to inquiry of C. Parry; means against Thyridopteryx ephemeræformis.
- 642. [Walsh, B. D., and C. V. Riley.] Tent-caterpillar. <Amer. Ent., June, 1869, v. 1, p. 208, fig. 145.
  - Answer to inquiry of S. Blanchard; characters of the imago and figures of the early stages of Clisiocampa americana; means against the same.
- 643. [Walsh, B. D., and C. V. Riley.] Hawk's pellets. <Amer. Ent., June, 1869, v. 1, p. 208.
  - Answer to inquiry of C. H. G.; insectivorous habits of *Buteo pennsylvanicus*. See No. 601.
- 614. [Walsh, B.D., and C. V. Riley.] Plant lice on berberry. < Amer. Ent., June, 1869, v. 1, p. 208.

  Answer to inquiry of J. R. Preston; means against Aphididæ.
- 645. [Walsh, B. D., and C. V. Riley.] Tent-caterpillar of the forest. <Amer. Ent., June, 1869, v. 1, p. 208, fig. 146.
  - Answer to inquiry of G. Whitcomb; characters, habits, parasites, means against, and figure of larva of Clisiocampa sylvatica [= disstria].
- 616. [Walsh, B. D., and C. V. Riley.] Cotton insects. <Amer. Ent., July, 1869, v. 1, pp. 209-214, fig. 147-151.
  - Descriptions and figures of all stages of Aletia xylina and of Heliothis armigera; habits, seasons, ravages, food-plants of, and means against the same; figures larva of Clisiocampa sylvatica [= disstria].
- 647. [Walsh, B. D., and C. V. Riley.] The true Army-worm (*Leucania unipuncta* Haworth). <Amer. Ent., July, 1869, v. 1, pp. 214–217, fig. 152–155.
  - Descriptions and figures of larva, pupa, and imago of Lencania unipuncta; seasons, ravages, and enemies of the same; figure of Exorista militaris [= Nemorwa leucaniw].
- 648. [Walsh, B. D., and C. V. Riley.] Belated individuals of the periodical Cicada. <Amer. Ent., July, 1869, v. 1, p. 217.
  - Occurrence of scattering individuals of *Tibicen septendecim* in years before or after their regular period.
- 649. [Walsh, B. D., and C. V. Riley.] Is the Curculio scarcer than it was last year? <Amer. Ent., July, 1869, v. 1, pp. 217, 218. Record of observations to prove the comparative scarcity of *Conotrachelus nenuphar* during 1869.
- 650. [Walsh, B. D., and C. V. Riley.] To destroy Colorado potato bugs. <Amer. Ent., July, 1869, v. 1, p. 219.
  - Reprint of communication of G. Liddle, with comments; Paris green as a means against *Doryphora* 10-lineata.
- 651. [Walsh, B. D., and C. V. Riley.] Dr. Hull's Curculio-catcher. <Amer. Ent., June, 1869, v. 1, pp. 220–221, fig. 156.

  Description and figure of Hull's Curculio-catcher.

- 652. [Walsh, B. D., and C. V. Riley.] The New York weevil (*Ithycerus noveboracensis*, Forster). <Amer. Ent., July, 1869, v. 1, pp. 221–222, fig. 157.
  - Habits, food-plants, distribution, description, and figure of larva and imago of *Ithycerus noveboracensis*; means against the same.
- 653. [Walsh, B. D., and C. V. Riley.] Mounding peach-trees again. <Amer. Ent., July, 1869, v. 1, p. 223.
  - Letter of A. Dean, with comments; characters and habitat of Mycetophila persica.
- 654. [Walsh, B. D., and C. V. Riley.] Overcrowded. < Amer. Ent., July, 1869, v. 1, p. 223.
  - Duties of a State entomologist; impossibility of answering inquiries received during the past month.
- 655. [Walsh, B. D., and C. V. Riley.] No air-holes needed in sending insects. <a href="mailto:Amer.Ent.">Amer. Ent.</a>, July, 1869, v. 1, p. 223.

  Directions for sending living insects.
- 656. [Walsh, B. D., and C. V. Riley.] Plum-leaf worms. < Amer. Ent., July, 1869, v. 1, p. 223.

  Answer to inquiry of W. D. Hiskey; characters of larva of Lyda sp.
- 657. [Walsh, B. D., and C. V. Riley.] Seed-corn maggot. <Amer. Ent., July, 1869, v. 1, p. 224, figs. 138–139.

  Answer to inquiry of G. Pauls; characters, ravages, means against, and figure

of larva of Anthomyia zeas; characters of the imago; figure of the puparium.

- 658. [WALSH, B. D., and C. V. RILEY.] Cut-worms. <Amer. Ent., July, 1869, v. 1, p. 224.

  Answer to inquiry of N. C. Birch; ravages of Agrotis telifera [= ypsilon].
- 659. [Walsh, B. D., and C. V. Riley.] New York weevil. <Amer. Ent., July, 1869, v. 1, p. 224.
  - Answer to inquiries of D. H. Kauffman and of W. D. Turrill; ravages of *Ithycerus noveboracensis*.
- 660. [WALSH, B. D., and C. V. RILEY.] Insects around peach-trees. <Amer. Ent., July, 1869, v. 1, p. 224.
  - Answer to inquiry of G. C. Brodhead; larvæ of Asilus sp. and of Mycetophila persicæ found around roots of peach-trees.
- 661. [WALSH, B. D., and C. V. RILEY.] Large green worm in a peach. <Amer. Ent., July, 1869, v. 1, p. 224.
  - Answer to inquiry of G. Wilgus; characters and food-habits of an undetermined larva found in a peach.
- 662. [Walsh, B. D., and C. V. Riley.] Ichneumon flies. < Amer. Ent., July, 1869, v. 1, p. 224.
  - Answer to inquiry of H. Klinehaus; characters and figure of cocoons of Microgaster sp.
- 663. [Walsh, B. D., and C. V. Riley.] Raspherry worms. < Amer. Ent., July, 1869, v. 1, p. 224.

Answer to inquiry of B. Borden; characters and ravages of Sclandria [=Mo-nophadnus] rubi.

- 664. [Walsh, B. D., and C. V. Riley.] Hairy grape-leaf folders. <Amer. Ent., July, 1869, v. 1, p. 224.
  - Answer to inquiry of A. C. Davis; characters of larva and image of *Pterophorus* [= Oxyptilus] periscelidactylus.
- \*665. [Walsh, B. D., and C. V. Riley.] Row of eggs in maple-twigs. <Amer. Ent., July, 1869, v. 1, p. 224.

Answer to inquiry of J. Bower; characters of eggs of undetermined katydid.

- 666. [Walsh, B. D., and C. V. Riley.] Butterfly named. < Amer. Ent., July, 1869, v. 1, p. 224.
  - Answer to inquiry of A. R. Bodley; characters of Papilio marcellus; foodplants of its larva.
- 667. [Walsh, B. D., and C. V. Riley.] Grasshopper seggs. < Amer. Ent., July, 1869, v. 1, p. 224.
  - Answer to inquiry of E. P. Burlingame; characters of the eggs of an undetermined grasshopper and of the image of *Œdipoda* [= *Dissosteria*] carolina.
- 668. [Walsh, B. D., and C. V. Riley.] Asilus fly larvæ. < Amer. Ent., July, 1869, v. 1, p. 225, figs. 161-162.
  - Answer to inquiry of G. Panls; characters, habits, and figure of larva of Asilus sp.; food-habits of larva and imago of A. sericeus; figure of the imago of the same; Trupanea [= Promachus] apivorus as a destroyer of bees.
- 669. [Walsh, B. D., and C. V. Riley.] New insect-foe of the black-berry. <Amer. Ent., July, 1869, v. 1, p. 225.
  - Answer to inquiry of C. Parry; comparative characters of Aphididæ and Psyllidæ; habits of Psylla rubi [= Trioza tripunctata].
- 670. [WALSH, B. D., and C. V. RILEY.] Army-worm. <Amer. Ent., July, 1869, v. 1, p. 225.
  - Answer to inquiry of J. H. Butts; ravages and food-plants of Leucania unipuncta.
- 671. [WALSH, B. D., and C. V. RILEY.] Green grape-vine worm. <Amer. Ent., July, 1869, v. 1, p. 225, fig. 163.
  - Answer to inquiry of G. Pauls; characters, food-plants, and figure of larva of Pyrophila pyramidoides.
- 672. [Walsh, B. D., and C. V. Riley.] Rose slug. <Amer. Ent., July, 1869, v. 1, p. 225.
  - Answer to inquiries of G. W. Copley and B. S. Morris; characters, ravages, and means against Selandria [= Monostegia] rosw.
- 673. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., July, 1869, v. 1, p. 225.
  - Answer to inquiry of J. Weed; food-habits of Leptostylus aculiferus and of Podabrus modestus.
- 674. [Walsh, B. D., and C. V. Riley.] Chrysalis of the virgin tiger moth. <Amer. Ent., July, 1869, v. 1, p. 225.
  - Answer to inquiry of C. Mallinckrodt; characters of Arctia virgo; supposed food-plants of its larva.
- 675. [WALSH, B. D., and C. V. RILEY.] Clover-worms. <Amer. Ent., July, 1869, v. 1, p. 226, fig. 164.
  - Answer to inquiry of E. P. Flanders; characters of Asopia costalis; habits of its larva; figures larva, pupa, cocoon, and imago.

- 676. [Walsh, B. D., and C. V. Riley.] Raspberry brand. < Amer. Ent., July, 1869, v. 1, p. 226.
  - Answer to inquiry of J. M. Beecher; larva of small gnat feeding on raspberry-brand.
- 677. [Walsh, B. D., and C. V. Riley.] Rese-worms. < Amer. Ent., July, 1869, v. 1, p. 226.
  - Answer to inquiry of G. S. Grover; character, ravages, food-plants, and means against *Heliothis margideus* [= Pyrrhia exprimeus].
- 678. [Walsh, B. D., and C. V. Riley.] Plum-tree plant-lice. <Amer. Ent., July, 1869, v. 1, p. 226, figs. 165–167.
  - Answer to inquiry of T. W. Gordon; characters of Aphis prunifolia and A. [=Myzus] cerasi; ravages, enemics, and means against Aphidida; figures larva of eoceinellid, syrphid and hemerobil.
- 679. [Walsh, B. D., and C. V. Riley.] Ichneumon-flies. <Amer. Ent., July, 1869, v. 1, p. 226.
  - Answer to inquiries of S. J. Throp and J. E. Trabue; life-habits of Microgaster sp.?
- 680. [Walsh, B. D., and C. V. Riley.] A new Curculio humbug. <Amer. Ent., July, 1869, v. 1, p. 226.
  - Answer to inquiry of E.P. Flanders; neelessness of a patent lamp for destroying Conotrachelus nenuphar.
- 681. [WALSH, B. D., and C. V. RILEY.] Sweet-potato beetles. < Amer. Ent., July, 1869, v. 1; p. 227.
  - Answer to inquiries of Subscriber and A. E. Trabue; food-habits and characters of larva and image of *Coptocycla aurichalcea* and of *C.* [= Cassida] bivittata.
- 682. [Walsh, B. D., and C. V. Riley.] Injured strawberry and grapevines. <Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of W. P. Pierson; ravages of Capsus oblineatus [= Lygus pratensis].
- 683. [Walsh, B. D., and C. V. Riley.] Plum-tree insects. <Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of J. F. Waters: characters of Bibio albipennis; food-habits of its larva.
- 684. [Walsh, B. D., and C. V. Riley.] Apple-tree bugs. <Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of W. L. Youse; character of Brochymena annulata.
- 685. [Walsh, B. D., and C. V. Riley.] Hickory-stem gall-louse. <Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of B. F. Long; characters of galls of *Phylloxera caryw-caulis*; food-habits of *Thrips*.
- 686. [WALSH, B.D., and C. V. RILEY.] Grape-vine leaf-hopper. < Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of R. M. Copeland; means against Tettigonia [= Typhlocyba] vitis.
- 687. [WALSH, B. D., and C. V. RILEY.] Twelve-spotted Diabrotica. <Amer. Ent., July, 1869, v. 1, p. 227, fig. 168.
  - Answer to inquiries of E. S. Foster and R. D. Parker; characters and means against *Diabrotica* 12-punctata; figure of the same.

- 688. [WALSH, B. D., and C. V. RILEY.] The caterpillar of the forest. <Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of M. McKenzie; food-habits and means against Clisio-campa sylvatica [= disstria].
- 689. [Walsh, B. D., and C. V. Riley.] Strawberry destroyer. < Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of G. W. Copley; habits of unknown strawberry destroyer.
- 690. [Walsh, B. D., and C. V. Riley.] Eggs of bugs on strawberry. <Amer. Ent., July, 1869, v. 1, p. 227.
  - Answer to inquiry of A. S. Fuller; characters of eggs of unknown reduvid attacked by parasites.
- 691. [Walsh, B. D., and C. V. Riley.] Frog-spittle insects. < Amer. Ent., July, 1869, v. 1, p. 228. Reprint: < Cultivator and Country Gentleman, 29 July, 1869, v. 34, p. 82.
  - Answer to inquiry of J. B. Hartwell; habits, characters, and injuries of Aphrophora quadrangularis.
- 692. [Walsh, B. D., and C. V. Riley.] Eggs of ground-beetle. < Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of E. J. Ayres; characters of eggs of undetermined ground-beetle found under bark of pear-twigs.
- 693. [Walsh, B. D., and C. V. Riley.] New insect-foe of the potato. <Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of I. Hicks; food-habits of Cassida [= Coptocycla] clavata.
- 694. [Walsh, B. D., and C. V. Riley.] Tomato-stalk borer. < Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of E. J. Ayres; Gortyna nitela injurious to tomato-stalks.
- 695. [Walsh, B. D., and C. V. Riley.] Breeding cages. < Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of H. S. Redney; description of cage for breeding insects.
- 696. [Walsh, B. D., and C. V. Riley.] Elm-tree borer. < Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of W. M. Gregory; characters and food-habits of *Physocnemum brevilineum*. See No. 583.
- 697. [Walsh, B. D., and C. V. Riley.] Peach-twig borer. < Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of G. Fisher; means against undetermined lepidopterous borer in twigs of peach.
- 698. [Walsh, B. D., and C. V. Riley.] Eggs of periodical Cicada in savin-twig. <Amer. Ent., July 1809, v. 1, p. 228.
  - Answer to inquiry of J. A. Greason; Tibicen septendecim ovipositing in twigs of Juniperus sabina.
- 699. [Walsh, B. D., and C. V. Riley.] Elm-tree saw-fly. < Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of A. R. Whitney; characters of larva and imago of Cimbex laportei [= americana]; food-plants of its larva.
- 700. [WALSH, B. D., and C. V. RILEY.] Snout-beetle. <Amer. Ent., July, 1869, v. 1, p. 228.
  - Answer to inquiry of H. Kleinhaus; supposed food-habits of Hylobius confusus.

701. [Walsh, B. D., and C. V. Riley.] The close of the first volume. <Amer. Ent., August, 1869, v. 1, p. 229.

Prospectus of the second volume of the American Entomologist.

- 702. [Walsh, B. D., and C. V. Riley.] The Royal horned caterpillar. (*Ceratocampa (Citheronia) regalis*, Fabr.). <Amer. Ent., August, 1869, v. 1, pp. 230-231, pl. 1.
  - Habits, seasons, sexual characters, food-plants, and vernacular names of *Citheronia regalis*; descriptions and figures of larva and pupa; figure of larva, pupa, and imago.
- 703. [Walsh, B. D., and C. V. Riley.] Comparative scarcity of the Curculio again. <a href="mailto:Amer.Ent.">Amer. Ent.</a>, August, 1869, v. 1, p. 241.

  Observations on the comparative abundance of Conotrachelus nenuphar during

the early summer of 1869.

- 704. [Walsh, B. D., and C. V. Riley.] A possible cause of the bee disease. <Amer. Ent., August, 1869, v. 1, pp. 241-242.

  Reprint of article by P. H. Philbrook (Amer. Bee Journal, May, 1869), with comments; dipterous enemies of the honey-bee.
- 705. [Walsh, B.D., and C.V. Riley.] Ash and mountain ash. < Amer. Ent., August, 1869, v. 1, pp. 243-244.

  Criticisms of paper of H. Shimer (Trans. Ill. State Hortic. Soc., 1868).
- 706. [Walsh, B. D., and C. V. Riley.] How the Curculio flies by night. <Amer. Ent., August, 1869, v. 1, p. 244. Extract from lecture by I. P. Trimble, with comment.
- 707. [Walsh, B. D., and C. V. Riley.] The periodical Cicada; our first brood established. <a href="mailto:Amer.Ent.">Amer. Ent.</a>, August, 1869, v. 1, p. 244. Appearance in Connecticut of a brood of Tibicen septendecim in 1869.
- 708. [Walsh, B. D., and C. V. Riley.] Be on the guard. <Amer. Ent., August, 1869, v. 1, p. 244.</li>
  Need of care in the trânsportation of living insects; accidental introduction of Doryphora 10-lineata.
- 709. [Walsh, B. D., and C. V. Riley.] Prophecy fulfilled. <Amer. Ent., August, 1869, v. 1, p. 244. Spread of *Doryphora* 10-lineata through Michigan.
- 710. [Walsh, B. D., and C. V. Riley.] A poisonous worm. <Amer. Ent., August, 1869, v. 1, p. 245.

  Extract from exchange; larva of Protoparce celeus not poisonous.
- 711. [Walsh, B. D., and C. V. Riley.] Wheat midge, alias milk weevil, alias red weevil. <Amer. Ent., August, 1869, v. 1, p. 245.
  - Answer to inquiry of C. Corbit; characters of larva of Cecidomyia [= Di-plosis] tritici; change in heads of wheat.
- 712. [Walsh, B. D., and C. V. Riley.] Large fish-fly. <Amer. Ent., August, 1869, v. 1, p. 245.

Answer to inquiry of A. R. McCutchen; characters of Chauliodes pectinicornis; habits of the larva of C. rastrucornis.

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- 713. [Walsh, B. D., and C. V. Riley.] Cottonwood leaf-galls. < Amer. Ent., August, 1869, v. 1, p. 245.
  - Answer to inquiry of J. B. Taylor; habits of *Pemphigus populicaulis*; characters of its gall.
- 714. [Walsh, B. D., and C. V. Riley.] Insects named. Amer. Ent., August, 1869, v. 1, p. 245.
  - Answer to inquiry of J. G. Goodrich; characters of Saperda bivittata [= can-dida].
- 715. [Walsh, B. D., and C. V. Riley.] Four-lined leaf-bug on current. <Amer. Ent., August, 1869, v. 1, p. 246.
  - Answer to inquiry of M. B. Bateman; characters, habits, and means against Capsus 4-vittatus [=  $Pacilocapsus\ lineatus$ ].
- 716. [Walsh, B. D., and C. V. Riley.] Bee moth. <Amer. Ent., August, 1869, v. 1, p. 246, fig. 182.
  - Answer to inquiry of S. Blanchard; ravages and means against Galleria cercana; figures larva, pupa, cocoon, and imago of the same.
- 717. [Walsh, B. D., and C. V. Riley.] Canker-worm parasites. <Amer. Ent., August, 1869, v. 1, p. 246.
  - Answer to inquiry of J. Petit; mention of Microgaster sp., parasitic on Anisopteryx.
- 718. [Walsh, B. D., and C. V. Riley.] Beetles swarming about the lawn. < Amer. Ent., August, 1869, v. 1, p. 246.
  - Answer to inquiry of S. Thompson; characters of Gym'netis [=Allorhina] nitida; habits of its larva.
- 719. [Walsh, B. D., and C. V. Riley.] Tiger-beetle larva. < Amer. Ent., August, 1869, v. 1, p. 246.
  - Answer to inquiry of R. J. Dodge; characters and habits of larva of Cicindelide.
- 720. [Walsh, B. D., and C. V. Riley.] Large compound gall on grapevine. <Amer. Ent., August, 1869, v. 1, p. 247, fig. 183.
  - Answer to inquiries of A. S. Fuller and D. W. Kauffman; characters and figure of gall of *Lasioptera vitis*; habits of its larva; enemy and parasite of the same.
- 721. [WALSH, B. D., and C. V. RILEY.] Insects named. < Amer. Ent., August, 1869, v. 1, p. 247.
  - Answer to inquiry of M. Treat; habits of larva of Temnochila [= Trogosita] virescens, of Aplodes [= Synchlora] rubivora, and of Calosoma calidum.
- 722. [Walsh, B. D., and C. V. Riley.] Destructive larvæ. < Amer. Ent., August, 1869, v. 1, p. 247.
  - Answer to inquiry of B. F. Lee; ravages of an undetermined larva; parasites of Saturnia [= Hemiteuca] maia.
- 723. [Walsh, B. D., and C. V. Riley.] Eggs of tree-cricket on grape-vine. <Amer. Ent., August, 1869, v. 1, p. 247.
  - Answer to inquiry of B. F. Lee; characters of eggs of *Œcanthus niveus*; carnivorous habits of the larva of the same.

- 724. [Walsh, B. D., and C. V. Riley.] Grape-vine leaf-gall. < Amer. Ent, August, 1869, v. 1, p. 248, fig. 184.
  - Answer to inquiry of A. A. Hilliard; characters and figure of the leaf-galls of *Phylloxera vitifolia* [= vastatrix]; its enemies and means against them; varieties of grape infested; identity of the leaf- and root-galls; criticism of the new genera and families of H. Shimer.
- 725. [Walsh, B. D., and C. V. Riley.] Grape-vine insects. <Amer. Ent., August, 1869, v. 1, p. 248.
  - Answer to inquiry of G. Pauls; characters of *Pelidnota punctata*; its larval habits; characters, habits, and food-plants of *Enchophyllum* [= *Enchenopa*] binotata.
- 726. [WALSH, B. D., and C. V. RILEY.] Museum pests. < Amer. Ent., August, 1869, v. 1, p. 248.

  Answer to inquiry of C. P. Faulkner; ravages of Dermestes lardarius.
- 727. [WALSH, B.D., and C. V. RILEY.] Wheat maggots. < Amer. Ent., August, 1869, v. 1, p. 248.
  - Answer to inquiry of S. K. Faulkner; characters of larva of Meromyza americana injurious to heads of wheat.
- 728. [Walsh, B. D., and C. V. Riley.] Parasites on "hateful grass-hopper." < Amer. Ent., August, 1869, v. 1, p. 249.
  - Answer to inquiry of S. K. Faulkner; characters and habits of Astoma = Trombidium] locustarum.
- 729. [Walsh, B. D., and C. V. Riley.] Crippled moths. < Amer. Ent., August, 1869, v. 1, p. 248.
  - Answer to inquiry of C. P. Faulkner; conditions needed to enable moths to expand their wings; means by which insects walk on smooth surfaces.
- 730. [Walsh, B. D., and C. V. Riley.] Insects on the oleander. <a href="#"><a href="#">Amer. Ent., August, 1869, v. 1, p. 249, fig. 185.</a>
  - Answer to inquiry of T. W. Gordon; means against undetermined Coccid on oleander; habits and figure of Chilocorus bivulnerus.
- 731. [Walsh, B. D., and C. V. Riley.] Insects found on apple-trees. <a href="#"><Amer. Ent., August, 1869, v. 1, p. 249.</a>
  - Answer to inquiry of J. W. Waters; identification of the eggs of Reduvius raptatorius [= Sinea diadema]; habits of Chilocorus bivulnerus.
- 732. [Walsh, B. D., and C. V. Riley.] Beetles named. < Amer. Ent., August, 1869, v. 1, p. 249.
  - Answer to inquiry of J. M. Shaffer; Lytta atrata [= Epicauta pennsylvanica] caught on rag-weed.
- 733. [Walsh, B. D., and C. V. Riley.] Gigantic water-bug. < Amer. Ent., August, 1869, v. 1, p. 249, fig. 186.
  - Answer to inquiry of E. M. Downing; habits and figure of Belostoma grandis [= americanum].
- 734. [Walsh, B. D., and C. V. Riley.] Worm eating into green tomatoes. <Amer. Ent., August, 1869, v. 1, p. 249.
  - Answer to inquiry of D. L. Hall; food-habits of Gortyna nitela.

- 735. [Walsh, B. D., and C. V. Riley.] Miscellaneous. < Amer. Ent., August, 1869, v. 1, p. 249.
  - Answer to inquiry of G. W. Copley; food-habits of Chrysochus auratus, Hemileuca maia, and Aphis [= Myzus] ribis; habits of Lozotwnia [= Cacwcia] rosaceana.
- 736. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., August, 1869, v. 1, p. 250.
  - Answer to inquiry of H. A. Munger; food-habits of Cassida pallida [= Coptocycla aurichalcea], Lytta murina [= Macrobasis unicolor], and of the larvæ of the species of Prionus.
- 737. [Walsh, B. D., and C. V. Riley.] Lightning-hoppers. < Amer. Ent., August, 1869. v. 1, p. 250.
  - Answer to inquiry of T. W. Gordon; characters and habits of Pæciloptera pruinosa; vernacular names of Fulgoridæ, Membracidæ, and Jassidæ.
- 738. [Walsh, B. D., and C. V. Riley.] Bag-worms. < Amer. Ent., August, 1869, v. 1, p. 250.
  - Answer to inquiries of T. W. Gordon and S. Thompson; food-habits of Thyridopteryx ephemeræformis.
- 739. [Walsh, B. D., and C. V. Riley.] Woolly gall on white oak. <a href="mailto:Amer.Ent.">Amer. Ent.</a>, August, 1869, v. 1, p. 250, fig. 187.
  - Answer to inquiry of A. S. Fuller; characters and figure of the gall of *Cynips* [=Andricus] seminator.
- 740. [Walsh, B. D., and C. V. Rilley.] Cabbage pests. < Amer. Ent., August, 1869, v. 1, p. 250.
  - Answer to inquiry of J. A. Williams; characters and habits of an undetermined elaterid larva; means against the larvæ of *Elateridæ*.
- 741. [WALSH, B. D., and C. V. RILEY.] Bugs gathering on pear shoots. <Amer. Ent., August, 1869, v. 1, p. 250.
  - Answer to inquiry of E. J. Ayres; characters and habits of Corimelana pulicaria.
- 742. [Walsh, B. D., and C. V. Riley.] Potato-bug. <Amer. Ent., August, 1869, v. 1, p. 250.
  - Answer to inquiry of J. B. Cartwell; food-habits of Cassida [= Coptocycla] elavata.
- 743. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of H. T. Birch; Trochilium [= Ægeria] acerni bred from maple.
- 744. [Walsh, B. D., and C. V. Riley.] Apple-tree worms. < Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of C. Waters; abundance of undetermined moth (Corycia vestaliata?); larva of the same on apple-trees.
- 745. [WALSH, B. D., and C. V. RILEY.] Oak-fig gall. <Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of A. Fendler; characters of the gall of Cynips [= Bio-rhiza] forticornis and of a guest-fly, Ceroptres ficus, inhabiting the same.

- 746. [WALSH, B. D., and C. V. RILEY.] Insects named. < Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of D. L. Phares; irregular appearance of Cicada tredecim [= Tibicen septendecim]; food-habits of Oncideres cingulata.
- 747. [Walsh, B.D., and C. V. Riley.] Small apple-leaf worms. < Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of H. Compton; means against Spilonota oculana [= Tme-tocera ocellana].
- 748. [Walsh, B. D., and C. V. Riley.] Rose bug on apples. < Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of A. Dean; food-plants and means against Macrodactylus subspinosus.
- 749. [Walsh, B. D., and C. V. Riley.] Unicorn apple-tree caterpillar. <Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of G. C. Brodhead; characters of the larva and imago of Notodonta [= Cwlodasys] unicornis; food-plants of the larva of the same.
- 750. [Walsh, B. D., and C. V. Riley.] Large water beetle. < Amer. Ent., August, 1869, v. 1, p. 251.
  - Answer to inquiry of S. E. Mumford; characters of Cybister fimbriolatus. See No. 816.
- 751. [Walsh, B. D., and C. V. Riley.] Beetles around peach-trees. <Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of E. Hollister, jr.; characters and habits of *Helops pullus* [= arcus].
- 752. [Walsh, B. D., and C. V. Riley.] A quick traveler. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of G. C. Brodhead; characters and harmlessness of Cermatia forceps.
- 753. [Walsh, B. D., and C. V. Riley.] Unknown moth. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of W.G. Barton; distribution of Junonia lavinia in Illinois.
- 754. [Walsh, B. D., and C. V. Riley.] Corn-borer. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of F. M. N.; identification of the larva of Gortyna nitela injurious to corn.
- 755. [Walsh, B. D., and C. V. Riley.] Horns of stag-beetle. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of C. R. Edwards; larval habits of Lucanus elaphus.
- 756. [Walsh, B. D., and C. V. Riley.] Imported gooseberry worms. <Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of C. P. Faulkner; means against Nematus ribesii.
- 757. [WALSH, B. D., and C. V. RILEY.] Worm on bark of walnut-tree. <a href="#"><Amer. Ent., August, 1869</a>, v. 1, p. 252.
  - Answer to inquiry of F. S. Fuller; undetermined notodontoid larva on the bark of walnut.

- 758. [Walsh, B. D., and C. V. Riley.] Rotten root. <Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of J. M. Beecher; scavenger habits of undetermined larva feeding on dead roots of apple-trees.
- 759. [Walsh, B. D., and C. V. Riley.] Large dragon-fly. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of G. S. Grover; characters and usefulness of Æschna constricta.
- 760. [Walsh, B. D., and C. V. Riley.] Stinging larvæ. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of E. H. King; characters and urticating properties of Saturnia [= Hemileuca] maia; peach-blow potatoes avoided by Doryphora 10-lineata.
- 761. [Walsh, B. D., and C. V. Riley.] Raspberry worms. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of E. H. Beebe; characters of larva of Selandria [=Mo-nophadnus] rubi.
- 762. [Walsh, B. D., and C. V. Riley.] Leaf-galls and caterpillars on the sugarberry. <Amer. Ent., August, 1869, v. 1, p. 252.

  Answer to inquiry of S. L. Scofield; undetermined gall on leaves of *Celtis* 
  - occidentalis; Orgyia leucostigma feeding on the leaves of the same.
- 763. [Walsh, B. D., and C. V. Riley.] Dark grape-worm. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of T. W. G.; characters and food-plants of Thyreus abbotii.
- 764. [Walsh, B. D., and C. V. Riley.] Too fond of honey. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of T. W. Gordon; Cermatia forceps found in a jar of honey.
- 765. [Walsh, B. D., and C. V. Riley.] Caterpillar of polyphemus moth. < Amer. Ent., August, 1869, v. 1, p. 252.
  - Answer to inquiry of A. De Wyl; larva of Telea polyphemus feeding on plums.
- 766. [Walsh, B. D., and C. V. Riley.] Why noxious insects increase upon us. <Amer. Ent., September-October, 1869, v. 2, pp. 1-2. Reasons why noxious insects increase; review of articles by E. S. Hull, H. W. Beecher, and Puritan.
- 767. [Walsh, B. D., and C. V. Riley.] Tortoise-beetles. < Amer. Ent., September-October, 1869, v. 2, pp. 2-5, figs. 1-3.
  - Resemblances of insects to other animals or to their surroundings; distribution, food-plants, and figure of Deloyala [= Coptocycla] clavata; description and figure of Physonota quinque-punctata n. sp. [= unipunctata]; figure of the larva of the same; correspondence of structural differences in larva with those in images of Cassidida, and with differences in food-plants; list of insects injurious to Solanum; figure of pupa and image of Chelymorpha cribraria [= argus].
- 768. [Walsh, B. D., and C. V. Riley.] Scientific nomenclature. <a href="mailto:kmer.Ent."><a href="mailto:kmer.Ent.">Amer. Ent.</a>, September-October, 1869, v. 2, pp. 5-8.
  - Rules observed in giving specific names to animals and plants; the law of priority; nature and extent of generic subdivisions.

- 769. [Walsh, B. D., and C. V. Riley.] Killing apple-worms by machinery. <Amer. Ent., September-October, 1869, v. 2, p. 9.
  - Extract from article of L. P. Haskell, with comment; use of rags in place of hay-bands as traps for *Carpocapsa pomonella*; destruction of the insects caught by means of a clothes-wringer.
- 770. [Walsh, B. D., and C. V. Riley.] A potter wasp (Odynerus flavipes? Fabr.). <Amer. Ent., September-October, 1869, v. 2, p. 10, fig. 4.
  - Method employed by Eumenidæ to provision their nests; construction of the same by species of Odynerus; habits of O. flavipes in provisioning a nest with several species of larvæ; figure of the imago of the same and of the nest of a species of Odynerus; structure of wings and habits of Vespidæ, Eumenidæ, and fossorial wasps.
- 771. [WALSH, B. D., and C. V. RILEY.] Tomato-worms not poisonous. < Amer. Ent., September-October, 1869, v. 2, p. 11.
  - Prejudices in regard to certain animals; presence of the horn on the larvæ of almost all Sphingidæ; larva of Protoparce celeus not poisonous.
- 772. [Walsh, B. D., and C. V. Riley.] Gooseberry and current worms. <Amer. Ent., September-October, 1869, v. 2, pp. 12-22, figs. 5-11.
  - Need of precision in nomenclature; relations and distribution of the North American species of Ribes; insect enemics of the same; natural history and description of Ellopia [= Eufitchia] ribearia, Nematus ventricosus [= ribesii], and Pristiphora grossularia; figures larva and imagos of the three species and the pupa of the Eufitchia.
- 773. [WALSH, B. D., and C. V. RILEY.] Striped cucumber beetle. <Amer. Ent., September-October, 1869, v. 2, p. 24, figs. 17-19. Answer to inquiry of M. M. Gray; description of larva, and habits, ravages of and means against the larva and imago of *Diabrotica vittata*; figures larva, pnpa, and imago of the same.
- 774. [WALSH, B. D., and C. V. RILEY.] Leafy oak-gall. < Amer. Ent., September-October, 1869, v. 2, p. 25, fig. 20.

  Answer to inquiry of B. H. B.; description and figure of the gall of Cynips q.-frondosa.
- 775. [Walsh, B. D., and C. V. Riley.] Drop of gold. <Amer. Ent., September-October, 1869, v. 2, p. 25.
  - Answer to inquiry of B. H. B.; egg of Citheronia regalis? on shellbark-hick-ory; characters of eggs and oviposition of Metapodius nasulus [= femoratus].
- 776. [WALSH, B. D., and C. V. RILEY.] The luna moth. <Amer. Ent., September-October, 1869, v. 2, p. 25.
  - Answer to inquiry of G. W. Kinney; characters of Attacus [= Actias] luna; food-plants of the larva of the same.
- 777. [Walsh, B. D., and C. V. Riley.] Hag-moth larva. <Amer. Ent., September-October, 1869, v. 2, p. 25, fig. 21.
  - Answer to inquiries of C. T. Farrell and M. B. Baldwin; characters of cocoon and imago of Limacodes [= Phobetron] pithecium; number of broods of the moth in the year; figure of the larva; occurrence of Harpactor [= Milyas] cinctus in Illinois.

- 778. [Walsh, B. D., and C. V. Riley.] Stinging bug. <a href="Amer. Ent.">Amer. Ent.</a>, September-October, 1869, v. 2, p. 25.
  - Answer to inquiry of J. M. Shaffer; habits and characters of Phymata erosa.
- 779. [Walsh, B. D., and C. V. Riley.] Pear-tree worms. < Amer. Ent., September-October, 1869, v. 2, p. 25.
  - Answer to inquiry of B. Hathaway; larva of Notodonta [= Œdemasia] concinna found on pear-tree leaves.
- 780. [Walsh, B. D., and C. V. Riley.] "Dobson." <Amer. Ent., September-October, 1869, v. 2, p. 25.
  - Answer to inquiry of Fisherman; ignorance as to what the larva called "Dobson" is.
- 781. [Walsh, B. D., and C. V. Riley.] White-pine weevil. < Amer. Ent., September-October, 1869. v. 2, p. 26, fig. 22.
  - Answer to inquiry of A. S. Fuller; seasons, ravages, and means against *Pissodes strobi*; figures larva, pupa, and imago of the same.
- 782. [Walsh, B. D., and C. V. Riley.] Unnatural secretion of wax. <a href="mailto:kmer.Ent.">Amer. Ent.</a>, September-October, 1869, v. 2, p. 26.
  - Answer to inquiry of F. Brewer; description of a case of excessive secretion of wax by Apis mellifica.
- 783. [Walsh, B. D., and C. V. Riley.] Raspberry borer. < Amer. Ent., September-October, 1869, v. 2, p. 26.
  - Answer to inquiry of F. A. Gates; ravages of the larva of Oberea perspicillata [=bimaculata] in blackberry and raspberry bushes; characters of the imago of Dryocampa senatoria; food-plants of the larva of the same.
- 784. [Walsh, B. D., and C. V. Riley.] Cocoon of horn-bug. < Amer. Ent., September-October, 1869, v. 2, p. 26.
  - Answer to inquiry of A. R. McClutchen; characters of cocoon of *Lucanus* dama?
- 785. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., September-October, 1869, v. 2, p. 26, fig. 23.
  - Answer to inquiry of J. R. Muhleman; characters and figure of Amphipyra [=Pyrophila] pyramidoides; food-plants and larva of the same and of A. pyramidea of Europe; characters of the larva and image of Agnomonia anilis; supposed food-plants of its larva.
- 786. [Walsh, B. D., and C. V. Riley.] Cecropia moth caterpillar. <Amer. Ent., September-October, 1869, v. 2, p. 26.
  - Answer to inquiries of H. G. Lewelling and S. H. I. Green; characters and food-plants of the larva of Attacus cecropia.
- 787. [Walsh, B. D., and C. V. Riley.] How cut-worms originate. <a href="#"><Amer. Ent.</a>, September-October, 1869, v. 2, p. 26.
  - Answer to inquiry of T. W. Gordon; cut-worms are larvæ produced from eggs of certain *Noctuidæ*.
- 788. [Walsh, B.D., and C. V. Rilley.] Red-humped caterpillar. < Amer. Ent., September-October, 1869, v. 2, p. 27, figs. 24-26.
  - Answer to inquiry of D. W. Kauffman; habits, characters, food-plants, and means against larva of *Notodonta* [= *Œdemasia*] *concinna*; figures larva, pupa, and image of the same; poisonousness of the fluids of certain insects.

- 789. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., September-October, 1869, v. 2, p. 27.
  - Answer to inquiry of T. W. G[ordon]; characters and food-plants of *Thelia bimaculata* and of larva of *Procris* [= Harrisina] americana and Eudamus tityrus; characters of the image of the last.
- 790. [Walsh, B. D., and C. V. Riley.] Gilt gold-beetle. < Amer. Ent., September-October, 1869, v. 2, p. 27.
  - Answer to inquiry of W. H. Martin; characters and food-plants of Chrysochus auratus.
- 791. [Walsh, B. D., and C. V. Riley.] The trumpet grape-gall. <Amer. Ent., September-October, 1869, v. 2, p. 28, fig. 27.
  - Answer to inquiry of D. McClaine; description and figure of galls of Cecido-myia vitislituus [=viticola]; occurrence of similar galls on several varieties of grape-vines and on leaves of hickory and hackberry.
- 792. [Walsh, B. D., and C. V. Riley.] Grape-berry moth. < Amer. Ent., September-October, 1869, v. 2, p. 28.
  - Answer to inquiry of H. C. Barnard; ravages of Penthina vitivorana [= Eudemis botrana].
- 793. [Walsh, B. D., and C. V. Riley.] Oak pruner. <Amer. Ent., September-October, 1869, v. 2, p. 28.
  - Answer to inquiry of T. J. Plnmb; occurrence of Elaphidion putator [=villosum] at Madison, Wis.
- 794. [Walsh, B. D., and C. V. Riley.] Potato-bugs. <Amer. Ent., September-October, 1869, v. 2, p. 28.
  - Answer to inquiry of W. R. Shelmire; ravages and food-plants of Lytta [= Epicauta] vittata; means against potato-eating Meloida; characters of an unknown lepidopterous larva boring in a potato-stalk; directions for packing insects.
- 795. [Walsh, B. D., and C. V. Riley.] Blood-sucking cone-nose. <Amer. Ent., September-October, 1869, v. 2, p. 28.
  - Answer to inquiry of G. W. C.; effect of the "bite" of Conorhinus sanguisuga; food-habits of the same.
- 796. [Walsh, B. D., and C. V. Riley.] Woolly slug-like worm on apple. <Amer. Ent., September-October, 1869, v. 2, p. 29.
  - Answer to inquiry of H. A. Green; food-plants and characters of larva of Lagoa opercularis; characters of the image of the same; improper method of packing living insects.
- 797. [Walsh, B. D., and C. V. Riley.] A water-bug. <Amer. Ent., September-October, 1869, v. 2, p. 29.
  - Answer to inquiry of W. V. Smith; characters of Ranatra fusca; habits and habitat of Nepidæ.
- 798. [Walsh, B. D., and C. V. Riley.] Goldenrod galls. <Amer. Ent., September-October, 1869, v. 2, p. 29.
  - Answer to inquiry of G. W. C.; characters of galls of Trypeta solidaginis and Cecidomyia solidaginis.

- 799. [Walsh, B. D., and C. V. Riley.] Oak-leaf gall. < Amer. Ent., September-October, 1869, v. 2, p. 29.
  - Answer to inquiry of B. H. Broadnox; description of galls of Cecidomyia quercus-pilulæ and C. q.-symmetrica; Cynipidæ inquilinous in galls of Cecidomyidæ; differences between larvæ of Cynipidæ and Cecidomyidæ; transformations of C. q.-pilulæ and of the Cynips sp., inquilinous in its gall; distinction between groups of oaks.
- 800. [Walsh, B. D., and C. V. Riley.] Humble bees. <Amer. Ent., September-October, 1869, v. 2, p. 30.
  - Answer to inquiry of C. S. Davis; number of species and distribution of the genus *Bombus* in North America; habits of and differences between the several forms composing a society of social insects; habits of *Bombus pennsylvanicus*, *Halictus* sp., and *Andrena* sp.
- 801. [Walsh, B. D., and C. V. Riley.] Can land be insured against cut-worms and other insects? <Amer. Ent., September-October, 1869, v. 2, p. 30.
  - Answer to inquiry of A. Willis; means against larvæ of cut-worms.
- 802. [Walsh, B. D., and C. V. Riley.] Beetles named. <a href="Amer. Ent.">Amer. Ent.</a>, September-October, 1869, v. 2, p. 30.
  - Answer to inquiry of T. W. Hoyt, jr.; characters of Cassida [=Coptocycla] aurichalcea and Brachinus americanus; effect of the discharge made by Brachinus sp. upon the inside of the human mouth.
- 803. [Walsh, B. D., and C. V. Riley.] Royal horned-caterpillar. <Amer. Ent., September-October, 1869, v. 2, p. 30.
  - Answer to inquiries of W. C. Holmes and M. G. Kern; larva of Citheronia regalis found feeding on Syringa.
- 804. [Walsh, B. D., and C. V. Riley.] Parsnip caterpillar. <Amer. Ent., September-October, 1869, v. 2, p. 30.
  - Answer to inquiry of T. W. Hoyt, jr.; characters of larva of Papilio asterias.
- 805. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., September-October, 1869, v. 2, p. 31.
  - Answer to inquiry of C. P. Faulkner; identification of several beetles; habits of Creophilus villosus, Listotrophus cingulatus, Scarites subterraneus, and Uloma impressa.
- 806. [Walsh, B. D., and C. V. Riley.] Beetle named. < Amer. Ent., September-October, 1869, v. 2, p. 31.
  - Answer to inquiry of W. Keyes; habits and characters of larva of Calopteron terminale; distinctness of C. reticulatum from C. terminale.
- 807. [Walsh, B. D., and C. V. Riley.] Moth named. <Amer. Ent., September-October, 1869, v. 2, p. 31.
  - Answer to inquiry of W. G. Barton; food-plant of larva and characters of imago of Alaria [= Rhodophora] florida.
- 808. [Walsh, B. D., and C. V. Riley.] Worm boring into cucumber. <Amer. Ent., September-October, 1869, v. 2, p. 31.
  - Answer to inquiries of G. W. C., O. L. Barler, and E. S. Smith; characters of larva and image of *Phakellura* [=Eudioptis] nitidalis; food-plants of larva; characters of undetermined larva found boring in cucumbers.

- 809. [Walsh, B. D., and C. V. Riley.] Caterpillar of the io moth. <Amer. Ent., September-October, 1869, v. 2, p. 31.
  - Answer to inquiry of Mrs. Tildesley; characters of larva and image of Saturnia [= Hyperchiria] io; food-plant and urticating properties of the larva.
- 810. [Walsh, B. D., and C. V. Riley.] Apple-tree worms. <Amer. Ent., September-October, 1869, v. 2, p. 32.
  - Answer to inquiry of H. K. Vickroy; habits and characters of larva of Acrobasis [= Pempelia] hammondi; habits of larva of Phycita nebulo [= Acrobasis indiginella].
- 811. [Walsh, B. D., and C. V. Riley.] Stinging larva. < Amer. Ent., September-October, 1869, v. 2, p. 32.
  - Answer to inquiry of J. C. Falls; meaning of the vernacular and technical names of *Empretia stimulea*; urticating properties of lepidopterous larvæ.
- 812. [Walsh, B. D., and C. V. Riley.] Lappet caterpillar on appletree. <Amer. Ent., September-October, 1869, v. 2, p. 32.

  Answer to inquiry of W. Stark; characters of larva of Gastropacha americana.
- 813. [Walsh, B. D., and C. V. Riley.] Spined spider. < Amer. Ent., September-October, 1869, v. 2, p. 32.

  Answer to inquiries of G. W. Kinney and T. W. Gordon; characters and
  - synonymy of Epeira [= Acrosoma] spinea.
- 814. [Walsh, B. D., and C. V. Riley.] Dangerous looking. <Amer Ent., September-October, 1869, v. 2, p. 32.
  - Answer to inquiry of M. M. Kenzie; characters and sting of Mutilla coccinea [= Sphærophthalma occidentalis].
- 815. [Walsh, B. D., and C. V. Riley.] Bag-worms again. <Amer. Ent., September-October, 1869, v. 2, p. 32.
  - Answer to inquiry of T. C. Tipton; ravages of Thyridopteryx ephemeræformis; harmlessness of larva of Protoparce celens; habitat of larva of Musca domestica.
- 816. [Walsh, B. D., and C. V. Riley.] Large water-beetle. < Amer. Ent., September-October, 1869, v. 2, p. 32.
  - Answer to inquiry of S. E. Munford; secondary sexual characters in elytra of *Cybister fimbriolatus*. See No. 750.
- 817. [Walsh, B. D., and C. V. Riley.] Beetles under dead fish. <Amer. Ent., September-October, 1869, v. 2, p. 32.
  - Answer to inquiry of T. Ferrell; food-habits and characters of Silpha peltata [=americana].
- 818. [Walsh, B. D., and C. V. Riley.] Universal remedies. <Amer. Ent., November, 1869, v. 2, pp., 33-35.
  - Worthlessness of any one substance as a means against insects.
- 819. [Walsh, B. D., and C. V. Riley.] Tent-caterpillars and fall-web-worms. <Amer. Ent., November, 1869, v. 2, p. 39.
  - Critical review of article in Western Rural, August 26, 1869; seasons, habits, food-plants, and characters of Clisiocampa americana and Hyphantria textor [=cunea].

- 820. [Walsh, B. D., and C. V. Riley.] The boll-worm or corn-worm. 2d article. (*Heliothis armigera*, Hübner.) <Amer. Ent., November, 1869, v. 2, pp. 42–44, fig. 29.
  - Seasons, food-plants, ravages of, and means against *Heliothis armigera*; figures of larvæ, pupa, cocoon, and imago of the same; food-plants of *Gortyna nitela*.
- 821. [Walsh, B. D., and C. V. Riley.] Galls and their architects. 2d article. <Amer. Ent., 1869–1870, v. 2: November, pp. 45–50, figs. 30–32; December–January, pp. 70–74, figs. 45–47; February, pp. 103–106, figs. 68–71.
  - See No. 518; definition and classification of galls; descriptions and figures of galls and larvæ of Nematus salicis-pomum, Euura s.-ovum, and E. s.-gemma [=orbitalis]; habits, seasons, and descriptions of the same; habits and seasons of Anthonomus sycophanta, Batrachedra salicipomonella, and Nematus mendicus; differences between gall-makers and guest-flies; occurrence of distinct genera of gall-insects on plants of distinct genera; descriptions and figures of galls of Cynips [= Andricus] quercus-seminator and C. q.-frondosa; synoptic table of North American genera of Cynipidæ Psenides; description of Antistrophus n. g. and of A. lygodesmiæ-pisum n. sp. and its gall; description and figure of the larva and imago of Agrilus ruficollis and its gall; habits, food-plants of, and means against, the same; figure and description of Baridius [=Ampeloglypter] sesostris and its gall; habits, food-plants of, and means against, the same; characters of Madarus ampelopsidos [=Ampeloglypter ater] and its gall; habits of Buprestidæ.
- 822. [Walsh, B. D., and C. V. Riley.] Toads in gardens. < Amer. Ent., November, 1869, v. 2, p. 50.
  Value of toads as a means against noxions insects, etc., in gardens.
- 823. [Walsh, B. D., and C. V. Riley.] Notes on the Tarantula-killer. <Amer. Ent., November, 1869, v. 2, p. 52.
  - Comments on note of C. Peabody; occurrence of Mygale hentzii and Pepsis formosa in Missouri.
- 824. [Walsh, B. D., and C. V. Riley.] Swarms of lady-birds. < Amer. Ent., November, 1869, v. 2, p. 55.
  - Occurrence of countless millions of Coccinellidae in England; their origin and movements.
- 825. [Walsh, B. D., and C. V. Riley.] The squash-bug does not touch the white bush scollop. <Amer. Ent., November, 1869, v. 2, p. 55.
  - Corens [= Anasa] tristis does not attack the white bush scollop variety of the squash-vine; means against the same.
- 826. [Walsh, B. D., and C. V. Riley.] [Scientific names.] < Amer. Ent., November, 1869, v. 2, p. 57.

  Use of English and scientific names of insects.
- 827. [Walsh, B. D., and C. V. Riley.] On our table. <Amer. Ent., November, 1869, v. 2, pp. 57-58.
  - Notices of: Record of American entomology for the year 1868.—The Canadian entomologist.—The butterflies of North America, by W. H. Edwards.—Guide to the study of insects, by A. S. Packard, jr., etc.

- 828. [Walsh, B. D., and C. V. Riley.] Locust borer. <Amer. Ent., November, 1869, v. 2, p. 58.
  - Answer to inquiry of J. Bagby; Arhopalus [= Cyllene] robinia Q undistinguishable from A. [= C.] pictus Q.
- 829. [Walsh, B. D., and C. V. Riley.] Saddle-back larva. < Amer. Ent., November, 1869, v. 2, p. 59, fig. 36.
  - Answer to inquiry of G. T. Cost; figure of the larva of *Empretia stimulea* found on Indian corn.
- 830. [Walsh, B. D., and C. V. Riley.] Silk spiders. < Amer. Ent., November, 1869, v. 2, p. 59.
  - Answer to inquiries of G. Howe and C. W. Spaulding; characters of *Epeira* [= Argiope] riparia and Nephila plumipes.
- 831. [Walsh, B. D., and C. V. Riley.] Entomological works. < Amer. Ent., November, 1869, v. 2, p. 59.
  - Answer to inquiry of S. W. Cowles; mention of works containing descriptions of North American Coleoptera and Lepidoptera; food-plants of the larva of *Eudryas unio*.
- 832. [Walsh, B. D., and C. V. Riley.] Insects named. < Amer. Ent., November, 1869, v. 2, p. 59.
  - Answer to inquiry of A. H. R. Bryant; characters of the cocoon of Attacus cecropia and the image of Mutilla coccinea [= Spharophthalma occidentalis].
- 833. [Walsh, B. D., and C. V. Riley.] A new bee enemy. < Amer. Ent., November, 1869, v. 2, p. 59.
  - Answer to inquiry of F. Brewer; characters of an undetermined carabid larva found eating Apis mellifica.
- 834. [Walsh, B. D., and C. V. Riley.] Thousand-legged worms. <Amer. Ent., November, 1869, v. 2, p. 59.
  - Answer to inquiry of J. W. Merchant; characters and poisonousness of Scolopendra castaneiceps; Julus sp. and Polydesmus sp. injurious to strawberries.
- 835. [Walsh, B. D., and C. V. Riley.] Cabbage-worms. < Amer. Ent., November, 1869, v. 2, p. 60, figs. 37–38.
  - Answer to inquiry of W. C. Holmes; figures larva, pupa, and image of *Pieris* protodice; means against cabbage-worms.
- 836. [Walsh, B. D., and C. V. Riley.] The rape butterfly. Amer. Ent., November, 1869, v. 2, p. 60.
  - Answer to inquiry of J. E. Chase; occurrence of Pieris rapæ in Bangor, Me.
- 837. [Walsh, B. D., and C. V. Riley.] Bad packing. < Amer. Ent., November, 1869, v. 2, p. 60.
  - Answer to inquiry of H. C. Beardslee; characters and food-plants of *Empretia stimulea*; food-plant of *Darapsa* [= *Ampelophaga*] myron; directions for sending larvæ by mail.
- 838. [Walsh, B.D., and C.V.Riley.] Granddaddy long-legs. < Amer. Ent., November, 1869, v. 2, p. 60.
  - Answer to inquiry of W. R. Howard; vernacular names and habits of *Phalangida*.
- 839. [Walsh, B. D., and C. V. Riley.] Borer in apple-twig. <Amer. Ent., November, 1869, v. 2, p. 60.
  - Answer to inquiry of G. C. Brackett; habits of Bostrichus [= Amphicerus] bicaudatus and Elaphidion parallelum [= villosum].

- 840. [Walsh, B. D., and C. V. Riley.] Grape-vine leaf-galls. < Amer. Ent., November, 1869, v. 2, p. 61.
  - Answer to inquiry of W. T. Heildrup; habits and means against *Phylloxera* vastatrix; varieties of grape infested by the same.
- 841. [Walsh, B. D., and C. V. Riley.] Maple-worms. < Amer. Ent., November, 1869, v. 2, p. 61.
  - Answer to inquiry of H. K. Vickroy; characters and ravages of *Dryocampa* rubicunda and Acronyeta americana; food-plants of Telea polyphemus and Attacus cecropia.
- 842. [Walsh, B. D., and C. V. Riley.] Melancholy chafer in apples. <Amer. Ent., November, 1869, v. 2, p. 61, fig. 39.
  - Answer to inquiry of J. F. Fulton; figure of Euryomia [=Euphoria] melan-cholica found boring in apples.
- 843. [Walsh, B. D., and C. V. Riley.] Worms boring in cucumbers. <Amer. Ent., November, 1869, v. 2, p. 61.
  - Answer to inquiry of W. B. Ramson; food-habits of *Phacellura* [= *Eudioptis*] nitidalis.
- 844. [Walsh, B. D., and C. V. Riley.] Lilac-borer. < Amer. Ent., November, 1869, v. 2, p. 61.
  - Answer to inquiry of T. J. Freeman; characters, affinities, and means against *Egeria* [= *Podosesia*] syringæ.
- 845. [Walsh, B. D., and C. V. Riley.] Burying beetles. < Amer. Ent., November, 1869, v. 2, p. 61.
  - Answer to inquiry of J. H. Osborn; habits of Necrophorus marginatus and of Silphidæ generally; characters of Hylobius stupidus [= Pachylobius picivorus] found on plum-trees.
- 846. [Walsh, B. D., and C. V. Riley.] Wire-worms in potatoes. <Amer. Ent., November, 1869, v. 2, p. 62.
  - Answer to inquiry of W. R. Shelmire; characters of larva (Melanotus incertus?) boring in potatoes; food-habits and means against larvæ of Elateridæ.
- 847. [Walsh, B. D., and C. V. Rilley.] Insects named. <Amer. Ent., November, 1869, v. 2, p. 62.
  - Answer to inquiry of J. F. Waters; unknown tortricid and *Limacodes* sp., found on apple-tree; characters of *Chariesterus antennator*.
- 848. [Walsh, B. D., and C. V. Riley.] Girdled pear twigs. < Amer. Ent., November, 1869, v. 2, p. 62.
  - Answer to inquiry of T. A. Thorp; pear twigs girdled by Oncideres cingulata.
- 849. [Walsh, B. D., and C. V. Riley.] Insects named. <Amer. Ent., November, 1869, v. 2, p. 62.
  - Answer to inquiry of E. T. Dale; food-habits of Hippodamia glacialis, Strachia [=Murgantia] histrionica and Blepharida rhois; figure of Hippodamia glacialis.
- 850. [Walsh, B. D., and C. V. Riley.] Tomato-feeding worm. < Amer. Ent., November, 1869, v. 2, p. 62, fig. 41.
  - Answer to inquiry of A. C. Davis; description, seasons, and food-plants of larva of *Prodenia commelinæ*; figure of dorsal surface of a segment of the same.

- 851. [Walsh, B. D., and C. V. Riley.] Cocoons of Ichneumon flies. <a href="#"><Amer. Ent.</a>, November, 1869, v. 2, p. 62.
  - Answer to inquiry of C. Mitchell; cocoons of *Microgaster* sp. found on larva of *Protoparce celcus*.
- 852. [Walsh, B. D., and C. V. Riley.] Gall on spotted touch-me-not. <Amer. Ent., November, 1869, v. 2, p. 63, fig. 42.
  - Answer to inquiry of A. N. Prentiss; description and figures of the gall of Cecidomyia impatientis found on Impatiens fulva.
- 853. [Walsh, B. D., and C. V. Riley.] Unknown larvæ. < Amer. Ent., November, 1869, v. 2, p. 63.
  - Answer to inquiry of J. M. Harold; characters of unknown larva allied to Lagoa.
- 854. [Walsh, B. D., and C. V. Riley.] Blood-sucking cone nose. <a href="mailto:Amer.Ent."></a>, November, 1869, v. 2, p. 63.
  - Answer to inquiry of D. B. Watson; occurrence of Conorhinus sanguisugus at Saint Louis, Mo.
- 855. [Walsh, B. D., and C. V. Riley.] Eggs on a grape-cane. < Amer. Ent., November, 1869, v. 2, p. 63.
  - Answer to inquiry of J. Cochrane; difficulty of identifying eggs of insects.
- 856. [Walsh, B. D., and C. V. Riley.] Gregarious willow-worms. <Amer. Ent., November, 1869, v. 2, p. 63.
  - Answer to inquiry of G. C. Brackett; characters, habits, and food-plants of the larva of Clostera americana [=Ichthyura inclusa].
- 857. [Walsh, B. D., and C. V. Riley.] Caterpillars named. <Amer. Ent., November, 1869, v. 2, p. 63.
  - Answer to inquiries of G. W. Copley and W. D. Butler; food-habits of larvæ of *Eudamus tityrus* and *Papilio troilus*.
- -858. [Walsh, B. D., and C. V. Riley.] Insects named. <Amer. Ent., November, 1869, v. 2, p. 63.
  - Answer to inquiry of L. G. Saffer; vernacular name of Mutilla coccinca [= Sphærophthalma occidentalis]; characters of Stizus [= Sphecius] speciosus.
- 859. [Walsh, B. D., and C. V. Riley.] Range of the rear-horse. <Amer. Ent., November, 1869, v. 2, p. 63.
  - Answer to inquiry of V. T. Chambers; northern range of Mantis [= Phasmomantis] carolina.
- 860. [Walsh, B. D., and C. V. Riley.] Royal horned-caterpillar. <Amer. Ent., November, 1869, v. 2, p. 64.
  - Answer to inquiry of D. L. Phares; Citheronia regalis more abundant in the South than in the North.
- 861. [Walsh, B. D., and C. V. Riley.] Hair-worm or hair-snake. <Amer. Ent., November, 1869, v. 2, p. 64.
  - Answer to inquiry of E. H. King; Gordius sp. parasitic in the pupa of Orchelimum sp.
- 862. [Walsh, B. D., and C. V. Riley.] Dahlia-stalk borer. <Amer. Ent., November, 1869, v. 2, p. 64.
  - Answer to inquiry of G. C. Broadhead; larva of Gortyna nitela boring in stalk of dahlia.
- 863. [Walsh, B. D., and C. V. Riley.] Parsnip worm. < Amer. Ent., November, 1869, v. 2, p. 64.
  - Answer to inquiry of J. Adams; larva of Papilio asterias feeds on parsnip.



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## BIBLIOGRAPHY

 $\mathbf{OF}$ 

## THE MORE IMPORTANT CONTRIBUTIONS

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## AMERICAN ECONOMIC ENTOMOLOGY.

PREPARED, BY AUTHORITY OF THE SECRETARY OF AGRICULTURE,

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PART III.

THE MORE IMPORTANT WRITINGS

 $\mathbf{OF}$ 

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# BIBLIOGRAPHY OF THE MORE IMPORTANT CONTRIBUTIONS TO AMERICAN ECONOMIC ENTOMOLOGY.

### PART III.

- 864. R[ILEY], C. [V.] The house-fly. < Prairie Farmer, 2 May, 1863, [v. 27], n. s., v. 11, pp. 276-277. S.-b. No. 1, p. 9.
  - Stomoxys calcitrans distinguished from Musca domestica; habits of each; transformations of the latter; habit of larvae of collecting underneath boards.
- 865. R[ILEY], C. [V.] The May-beetle. < Prairie Farmer, 6 June, 1863, [v. 27], n. s., v. 11, p. 356. S.-b. No. 1, p. 7.
  - Ravages of *Phyllophaga quercina* [= Lachnosterna fusca]; description and habits of larvæ and imagos; remedies.
- 866. R[ILEY], C. V. Larvæ of the ten-striped spearman. <Prairie Farmer, 8 August, 1863, [v. 28], n. s., v. 12, pp. 85–86, fig. S.-b. No. 1, p. 11.
  - Description of eggs; figure and first description of larva of *Doryphora* 10-lineata; habits of larva; seasons; remedies; enemies of larva.
- 867. R[ILEY], C. V. The squash-bug. <Prairie Farmer, 8 August, 1863, [v. 28], n. s., v. 12, p. 86. S.-b. No. 1, p. 11.
  - Description of images and larvæ of Coreus [= Anasa] tristis; habits, seasons, remedies.
- 868. RILEY, C. V. The cut-worm. < Prairie Farmer, 12 March, 1864, [v. 29], n. s., v. 13, p. 169.
  - Answer to communication of G. R. Huffman; habits and transformations of Agrotididæ; means against them.
- 869. [RILEY, C. V.] Eutomological. <Prairie Farmer, 21 May, 1864, [v. 29], n. s., v. 13, p. 361.
  - Answer to communication of J. S. Lawver; ravages of unknown caterpillars, probably cut-worms, and of *Ithycerus noveboracensis* on young appletrees; means against these insects.
- 870. [RILEY, C. V.] Apple-borers. < Prairie Farmer, 14 January, 1865, [v. 31], n. s., v. 15, p. 21, 5 figs. S.-b. No. 1, p. 30.
  - Description and figure of larva and image of Buprestis [= Chrysobothris] femorata; injury done by the larva; remedies. Figure of image of Saperda bivittata [= candida].

- 871. [RILEY, C. V.] Peach-tree borers. <Prairie Farmer, 25 February, 1865, [v. 31], n. s., v. 15, pp. 122–123, 6 figs. S.-b. No. 1, pp. 30–31.
  - Descriptions and figures of larva, pupa, cocoon, and  $\beta$  and  $\varphi$  images of Egeria[=Sannina] exitiosa; description of egg; seasons and habits of larva and image; remedies. Figure of image of Dicerca divarienta.
- 872. [RILEY, C. V.] Entomology. < Prairie Farmer, 22 April, 1865, [v. 31], n. s., v. 15, p. 306. S.-b. No. 1, pp. 32–33.
  - Coming forth of insects in spring; desirability of observing noxious insects and of recording observations; abundance of eggs of *Orgyia* this season; methods of destroying them.
- 873. [RILEY, C. V.] Flea-beetles and Curculio. <Prairie Farmer, 27 May, 1865, [v. 31], n. s., v. 15, p. 418, fig. S.-b. No. 1, p. 33.
  - Prevalence of and means against *Halticide*; habits of and means against *Conotrachelus nenuphar*; figure of pupa.
- 874. [RILEY, C. V.] Applé-tree caterpillars. < Prairie Farmer, 3 June, 1865, [v. 31], n. s., v. 15, pp. 437–438. S.-b. No. 1, p. 34.
  - Answer to communication from J. C. Brown; descriptions of larva, pupa, and imago, of *Chwtochilus pometellus*; habits of the same; other caterpillars injurious to the leaves of apple trees and means against them.
- 875. [RILEY, C. V.] Curculio catcher. <Prairie Farmer, 10 June, 1865 [v. 31], n. s., v. 15, p. 457, fig.
  Figure of E. S. Hull's Curculio catcher, with explanatory text.
- 876. [RILEY, C. V.] The army-worm. < Prairie Farmer, 8 July, 1865, [v. 32], n. s., v. 16, pp. 3-4, 3 figs. S.-b. No. 1, pp. 36-37.
  - Answer to communication from W. R.; descriptions and figures of larva, pupa, and imago of *Leucania unipuncta*; number of broods unknown; remedies.
- 877. [RILEY, C. V.] The current-worm. < Prairie Farmer, 15 July, 1865, [v. 32], n. s., v. 16, p. 27, 4 figs. S.-b. No. 1, p. 36.
  - Description of eggs; descriptions and figures of larva, pupa, and imago of Eufitchia ribearia; habits, seasons, remedies.
- 878. [RILEY, C. V.] Swallows. < Prairie Farmer, 15 July, 1865, [v. 32], n. s., v. 16, p. 27. S.-b. No. 1, p. 36.
  Usefulness of swallows in the destruction of noxious insects.
- 879. [RILEY, C. V.] Another insect friend. < Prairie Farmer, 22 July, 1865, [v. 32], n. s., v. 16, p. 50. S. b. No. 1, p. 35.
  - Rogas n. sp. parasitic on larva of Sesia pelasgus? [= Hemaris thysbe]; economic benefits of parasitism.
- 880. [RILEY, C. V.] Singular caterpillar. <Prairie Farmer, 22 July, 1865, [v. 32], n. s., v. 16, p. 50. S.-b. No. 1, p. 35.
  - Descriptions of larva, pupa, and imago of *Notodonta* [= Calodasys] unicornis; habits; food-plants.
- 881. [RILEY, C. V.] Collecting and preserving insects. <Prairie Farmer, 5 August, 1865, [v. 32], n. s., v. 16, pp. 101–102, fig.
  - Interest and importance of entomology; directions for the construction of nets and cabinets, and for the capture, killing, preparation, and preservation of insects.

- 822. RILEY, C. V. The grass-bug and its habits: Currant-worms. <Cultivator and Country Gentleman, 10 August, 1865, v. 26, p. 98. Reprint: <Boston Cultivator, 19 August, 1865, v. 37, p. 259. S.-b. No. 1, p. 60.
  - Habits of Cercopidida; nature of the imago of currant-worms.
- 883. [RILEY, C. V.] Apple plant-louse. <Prairie Farmer, 19 August, 1865, [v. 32], n. s., v. 16, p. 127. S.-b. No. 1, p. 40.

  Answer to inquiry of J. Doron; habits and fecundity of Aphis mali; means against it.
- 884. R[ILEY], C. [V.] Seventeen-year locust. <Prairie Farmer, 19 August, 1865, [v. 32.], n. s., v. 16, p. 127. S.-b. No. 1, pp. 40-41. Agrees with S. P. G. in doubting that Cicada [= Tibicen] septendecim lives seventeen years immature, and gives reasons for his doubt.
- 885. [RILEY, C. V.] Tobacco-worm. < Prairie Farmer, 2 September, 1865, [v. 32], n. s., v. 16, p. 165. S.-b. No. 1, p. 41.

  Answer to inquiry of A. B. Knowlton; habits of Macrosila quinquemaculata [= Protoparce celeus].
- 887. RILEY, C. V. The sheep gad-fly. <Prairie Farmer, 14 October, 1865, [v. 32], n. s., v. 16, pp. 288–289, figs. 1–6. S.-b. No. 1, pp. 48–49.
  - Answer to inquiries of a subscriber; figures and descriptions of larva, pupacase, and imago of Cephalemyia [= Œstrus] ovis; habits of and means against it; imago viviparous.
- 888. [RILEY, C. V.] Chinch-bug not in seed grain. <Prairie Farmer,

  21 October, 1865, [v. 32], n. s., v. 16, p. 308. S.-b. No. 1, p. 4.

  Supposed evidence that the eggs of Blissus leucopterus are not deposited and do not winter in seed wheat.
- 889. [RILEY, C. V.] Lice on calves. <a href="#">Prairie Farmer</a>, 13 January, 1865, [v. 33], n. s., v. 17, p. 24.

  Directions, on the authority of Robert Jennings, for freeing calves of lice.
- 890. [RILEY, C. V.] The chinch bug once more. A reply to D. H. Sherman. <Waukegan [Ill.] Gazette, 20 January, 1866, v. 16, No. 18, p. 4.
  - Critical review of article of D. H. Sherman.
- 891. RILEY, C. V. The chinch-bug. <Prairie Farmer, 3 March, 1866, [v. 33], n. s., v. 17, p. 133. S.-b. No. 1, p. 71.

  Answer to inquiry of W. R. Everett; means against Blissus leucopterus; habits, hibernation, and oviposition.
- 892. [RILEY, C. V.] Wire-worms. < Prairie Farmer, 3 March, 1866, [v. 33], n. s., v. 17, p. 133, figs. 4-5. S.-b. No. 1, p. 71.

  Answer to inquiry of —— Creswell; means against larve of Elateridæ.

- 893. R[ILEY], C. V. Entomological. < Prairie Farmer, 24 March, 1866, [v. 33], n. s., v. 17, p. 192, figs. 5-6. S.-b. No. 1, p. 68.
  - Answers to inquiries of E. T. Nelson, J. Doron, and H. W. Shore; habits and figures of *Amphicerus bicaudatus*; remedies. Apple-twigs pierced by one of the *Uroccrida*.
- 894. RILEY, C. V. The chinch-bug. < Pract. Ent., 26 March, 1866, v. 1, pp. 47-48.
  - Criticism of D. H. Sherman's communication on this insect; Blissus leucopterus does not oviposit in the fuzzy end of wheat-grain; brief life-history.
- 895. RILEY, C. V. The chinch-bug once more. <Waukegan [Ill.] Gazette, 31 March, 1866, v. 16, No. 28, p. 4. S.-b. No. 1, p. 70.

Reply to D. H. Sherman's second communication; Blissus leucopterus does not deposit its eggs in the grain of wheat; means against it.

- 896. [RILEY, C. V.] Bark-lice remedy. < Prairie Farmer, 7 April, 1866, [v. 33], n. s., v. 17, p. 229. S.-b. No. 1, p. 79.
  - Answers to inquiries of a subscriber and of S. J. B.; means against *Mytilas-* pis pomicorticis [= pomorum].
- 897. [RILEY, C. V.] "Bug" on melon, etc. < Prairie Farmer, 7 April, 1866, [v. 33], n. s., v. 17, p. 229. S.-b. No. 1, p. 79.

  Answer to inquiry of M. E. W.; means against Diabrotica vittata.
- 898. [RILEY, C. V.] Warbles. < Prairie Farmer, 21 April, 1866, [v. 33], n. s., v. 17, p. 276.

The occurrence of lumps on the back of cattle caused by larvæ of *Hypoderma* boris is not unusual or alarming.

- 899. RILEY, C. V. The ailanthus silk-worm. <Prairie Farmer, 28 April, 1866, [v. 33], n. s., v. 17, p. 289, fig. S.-b. No. 1, p. 93. Partial reprint: <New York Tribune, 29 May, 1866, v. 26, No. 7844, p. 7. S.-b. No. 1, p. 92.
  - Describes attempts to introduce Bombyx arrindia and Samia [=Attacus] cynthia into Europe for commercial purposes. Describes and figures egg, larva, and imago, and figures pupa of Samia [=Attacus] cynthia; habits, seasons, and hardiness, and disadvantages for purposes of silk culture of this species; superiority of native species.
- 900. [RILEY, C. V.] Lice on pigs. < Prairie Farmer, 28 April, 1866, [v. 33], n. s., v. 17, p. 292.

  Means against.
- 901. RILEY, C. V. Novel facts about cut-worms. <Prairie Farmer, 2 June, 1866, [v. 33], n. s., v. 17, pp. 371, 372, figs. 3-8. S.-b. No. 1, p. 89.
  - \* Climbing habits of the larvæ of Agrotididæ; figures and descriptions of the larvæ of Agrotis cochranii [= A. messoria], A. clandestina, and ? Hadena subjuncta; enemies of cut-worms.
- 902. [RILEY, C. V.] The canker-worm. <Prairie Farmer, 16 June, 1866, [v. 33], n. s., v. 17, p. 412. S.-b. No. 1, p. 96.

  Answer to inquiry of a subscriber; means against Anisopteryx.
- 903. R[ILEY], C. V. Large fish-fly. < Prairie Farmer, 16 June, 1866, [v. 33], n. s., v. 17, p. 412. S.-b. No. 1, p. 96.

Answer to inquiry of A. B. Knowlton; habits and distribution of Perla dor-sata.

- 904. RILEY, C. V. The bee-moth. < Cultivator and Country Gentleman, 21 June, 1866, v. 27, p. 399. S.-b. No. 1, p. 97. Answer to inquiry of E. S. Fowler; habits of Galleria cercana.
- 905. RILEY, C. V. The potato-bug. <Prairie Farmer, 23 June, 1866, [v. 33], n. s., v. 17, p. 432. S.-b. No. 1, p. 97. Answer to inquiry of J. D. Ellington; eastward spreading of and means

against Doryphora decemlineata.

- 906. [Riley, C. V.] Army-worm. < Prairie Farmer, 23 June, 1866, [v. 33], n. s., v. 17, p. 432. S.-b. No. 1, p. 97. Occurrence of Leucania unipuncta in various parts of Illinois.
- 907. RILEY, C. V. White willow insects. < Prairie Farmer, 30 June, 1866, [v. 33], n. s., v. 17, p. 452. S.-b. No. 1, p. 101. Answer to inquiry of L. G. H.; descriptions of larva, pupa, and image of

Vanessa antiopa; description of larva of Nematus ventralis; habits of and

means against thesc.

- 908. RILEY, C. V. Still they come. < Prairie Farmer, 30 June, 1866, [v. 33], n. s., v. 17, p. 452. S.-b. No. 1, p. 101. Answer to inquiry of S. D.; means against Doryphora decemlineata.
- 909. RILEY, C. V. The worm question. < Ohio Farmer, 7 July, 1866, v. 15, p. 209. S.-b. No. 2, p. 17.

Comments on a controversy between J. K. and J. Brocket concerning Pyrrharctia isabella; molting, pupation, and eocoon-making of this and other eaterpillars.

- 910. RILEY, C. V. Army-worm and canker-worm wisdom. < Prairie Farmer, 21 July, 1866, [v. 34], n. s., v. 18, p. 38. S.-b. No. 1, p. 101; No. 2, p. 40.
  - Comments on entomological ignorance amongst members of the Fruit Grower's Society of Western New York; efficacy of means against Anisopteryx.
- 911. R[ILEY], C. V. [Attacus cecropia.] < Prairie Farmer, 21 July, 1866, [v. 34], n. s., v. 18, p. 40. S.-b. No. 1, p. 104; No. 2, p. 40. Answer to inquiry of F. T.; habits of Attacus cecropia; its usefulness for silk.
- 912. R[ILEY], C. V. [Cantharis cinerea.] < Prairie Farmer, 21 July, 1866, [v. 34], n. s., v. 18, p. 40. S.-b. No. 1, p. 104; No. 2, p. 40. Answer to inquiry of W. D. Hoord; criticizes the figure of Lytta fabricii [=Macrobasis unicolor] in Harris' Insects; usefulness of the Meloida as vesicants; habits of and means against M. unicolor.
- 913. RILEY, C. V. [Edema albifrons.] < Prairie Farmer, 1 August 1866, [v. 34], n. s., v. 18, p. 73. S.-b. No. 1, p. 110. Answer to inquiry of H. Kennedy; probability of unknown notodontoid

proving Edema albifrons.

914. RILEY, C. V. Practical entomology in reality. < Maine Farmer, 2 August, 1866. S.-b. No. 2, p. 21.

Critical review of Brackett's Practical Entomology No. 9; some eut-worms do elimb trees; Estrus ovis is viviparous.

915. RILEY, C. V. [Clytus speciosus.] < Prairie Farmer, 4 August, 1866, [v. 34], n. s., v. 18, p. 73. S.-b. No. 1, p. 110.

Answer to inquiry of C. L. Edwards; habits of and means against Clytus [= Plagionotus] speciosus injuring maple-trees; description of larva of Anisota [= Dryocampa] rubicunda which feeds upon maple leaves.

- 916. RILEY, C. V. Grape-leaf louse. < Prairie Farmer, 4 August, 1866, [v. 34], n. s., v. 18, p. 73. S.-b. No. 1, p. 110.

  Answer to inquiries of "Subscriber" description, habits and development
  - Answer to inquiries of "Subscriber"; description, habits and development of Pemphigus vitifoliæ [= Phylloxera vastatrix].
- 917. RILEY, C. V. White willow worm. < Prairie Farmer, 4 August, 1866, [v. 34], n. s., v. 18, p. 73. S.-b. No. 1, p. 110.
  - Descriptions of larva and imago of Nematus ventralis; food-plants; ravages and number of broods.
- 918. RILEY, C. V. Insects in timber. < Prairie Farmer, 4 August, 1866, [v. 34], n. s., v. 18, p. 73. S.-b. No. 1, p. 110.
  - Unknown species of *Tortricidæ* injurious to forests in Brown and Schuyler Counties, Illinois, in 1865.
- 919. RILEY, C. V. Derneue Kartoffel-Käfer. < Deutsche Prairie Farmer, August, 1866, 2 figs. S.-b. No. 2, p. 14.
  - Descriptions and figures of larva and imago of *Doryphora decembineata*; its eastern migrations; habits; means against it.
- 920. RILEY, C.'V. Cicadas and walking-sticks. < Prairie Farmer, 1
  September, 1866, [v. 34], n. s., v. 18, p. 136. S.-b. No. 2, p. 41.

  Answer to inquiry of L. D. Swein: condensed account of Cicada agricularia.
  - Answer to inquiry of J. D. Swain; condensed account of Cicada canicularis [=tibicen]; comparison with C. [=Tibicen] septendecim; mentions Spectrum [=Diapheromera] femoratum.
- 921. [RILEY, C. V.] Locust-borer. < Prairie Farmer, 1 September, 1866, [v. 34], n. s., v. 18, p. 140.
  - Answer to inquiry of O. H. S.; nearly all of the locust groves in the West have been destroyed by Clytus [= Cyllene] robiniæ; no remedy known.
- 922. RILEY, C. V. Apple-tree caterpillars. < Prairie Farmer, 8 September, 1866, [v. 34], n. s., v. 18, p. 152. S.-b. No. 2, p. 41.
  - Answer to inquiries of S. Caverno and H. M. Lyman; habits, descriptions of larvæ, and imagos of *Datana ministra* and *Notodonta* [= Ædemasia] concinna; means against them; description of pnpa of *Datana ministra*.
- 923. RILEY, C. V. Joint-worm. < Prairie Farmer, 8 September, 1866, [v. 34], n. s., v. 18, p. 152. S.-b. No. 2, p. 41.
  - Answer to inquiry of G. W. Conklin; habits of and means against Isosoma hordei.
- 924. RILEY, C. V. [Nematus ventralis.] < Prairie Farmer, 8 September, 1866, [v. 34], n. s., v. 18, p. 152.
  - Answer to inquiry of G. E. W.; ravages of Nematus ventralis in Kalmar, Minn.
- 925. [RILEY, C. V.] Ten-lined potato-beetle. < Prairie Farmer, 8 September, 1866, [v. 34], n. s., v. 18, p. 152. S.-b. No. 2, p. 42.

  Larva of Lang trilinguta on potato plants in Maine mistaken for that of De-
  - Larva of Lema trilineata on potato plants in Maine mistaken for that of Doryphora decemlineata.
- 926. [RILEY, C. V.] Locusts. < Prairie Farmer, 3 November, 1866, [v. 34], n. s., v. 18, p. 290.
  - Occurrence and ravages of *Calopterius spretus* in portions of Kansas and western United States in 1866.
- 927. RILEY, C. V. Caterpillars on the pine. < Prairie Farmer, 10 November, 1866, [v. 34], n. s., v. 18, p. 301. S.-b. No. 2, p. 42.
  - Answer to inquiry of N. R. Strong and A. L. Jones; detailed description of larva of *Lophyrus abbotii*; habits of larva; means against the insect.

928. RILEY, C. V. Elm- and pear-tree borer. <Prairie Farmer, 10 November, 1866, [v. 34], n. s., v. 18, p. 301. S.-b. No. 2, p. 42.

Answer to inquiry of James Matteson; description and habits of Tremex

columba.

- 929. RILEY, C. V. Grasshoppers and locusts. < Prairie Farmer, 24 November, 1866, [v. 34], n. s., v. 18, p. 333. S.-b. No. 2, pp. 43-44.
  - Answer to inquiry of J. N.; distinguishes grasshoppers from locusts; characterizes Achetadw [= Gryllidw], Gryllidw [= Locustidw], and Locustidw [= Acrididw]; oviposition, transformations, ravages, and migrations of Acrididw; recognition of  $Caloptenus\ spretus$ .
- 930. RILEY, C. V. Black-knot once more. <Gardeners' Mo. and Hortic., November, 1866, v. 8, pp. 331-332. S.-b. No. 2, p. 31. Fungoid origin of black-knot [Sphæria morbosa]; larvæ of Conotrachelus nenuphar present in the swellings.
- 931. R[ILEY], C. V. Brimstone for borers. <Prairie Farmer, 8 December, 1866, [v. 34], n. s., v. 18, p. 365. S.-b. No. 2, p. 44. Criticism of a communication by W.; sulphur inserted in trunks of trees ineffectual as a means against insects.
- 932. RILEY, C. V. The wire-worm. <Cultivator and Country Gentleman, 27 December, 1866, v. 28, p. 414. S.-b. No. 2, p. 34. Critical review of J. D. Gros' "The wire-worm;" myriapods and the larvæ of *Elateridæ* are called wire-worms; separable by the number of their legs; means against them.
- 933. [RILEY, C. V.] Tilden tomato and the tobacco-worm. < Prairie Farmer, 5 January, 1867, [v. 35], n. s., v. 19, p. 5.

  Remarks on communication of T. B.; tomato plants eaten by tobacco-worms [Protoparce carolina] in preference to tobacco plants; possibly the worms observed were tomato-worms [P. celeus].
- 934. [RILEY, C. V.] Remarks on Saperda, Chrysobothris, Carpocapsa, and Conotrachelus. < Prairie Farmer, 12 January, 1867, [v. 35], n. s., v. 19, p. 23.
  - Report of remarks made at the annual meeting of Southern Illinois Fruit Growers' Association.
- 935. [RILEY, C. V.] Bark-lice. <Prairie Farmer, 12 January, 1867, [v. 35], n. s., v. 19, p. 24.
  Washing apple-trees with lye effective against bark-lice.
- 936. RILEY, C. V. Insects in the flower garden. A troublous time. <Prairie Farmer, 19 January, 1867, [v. 35], n. s., v. 19, p. 37. S.-b. No. 2, p. 45.
  - Answer to communication by Kate Sherman; describes larva of [Heliothis phlogophagus] injuring Phlox.
- 937. [RILEY, C. V.] Salt and vinegar for insects. < Prairie Farmer, 19 January, 1867, [v. 35], n. s., v. 19, p. 37. S.-b. No. 2, p. 45. Review of T. Glover's Report of the U. S. Entomologist for 1865, T. Glover's Entomological exhibition in Paris, and W. C. Lodge's Fruits and fruit trees of the Middle States; use of salt and vinegar as means against insects; criticism of errors. See Nos. 222, 939, 942.

- 938. RILEY, C. V. Hickory bark borer, *Scolytus caryæ*, n. sp. < Prairie Farmer, 2 February, 1867, [v. 35], n. s., v. 19, pp. 68, 69, 6 figs. S.-b. No. 2, p. 50.
  - Descriptions and figures of larva and image of Scolytus caryæn. sp. [=4-spinosus] and of its borings in bark and wood of Carya; habits and ravages; figure of the pupa of S. destructor of Europe.
- 939. [RILEY, C. V.] Correction. < Prairie Farmer, 2 February, 1867, [v. 35], n. s., v. 19, p. 69. S.-b. No. 2, p. 50.
  - Correction of statement made in No. 937; T. Glover not responsible for calling Saperda bivittata [=candida] a butterfly. See Nos. 222, 937, 942.
- 940. RILEY, C. V. Dahlia and aster stalk-borer, Gortyna nitela Guenée. <Prairie Farmer, 23 February, 1867, [v. 35], n. s., v. 19, p. 116, 2 figs. S.-b. No. 2, p. 58.
  - Description of larva, pupa, and image of Gortyna nitela; habits of and means against this insect.
- 941. R[ILEY], C. V. Borers and canker-worms. < Prairie Farmer, 9 March, 1867, [v. 35], n. s., v. 19, p. 151. S. b. No. 2, p. 61.
  - Critical review of E. H. C.'s "Remedy for the borer" and of J. Huggins' "Canker-worm;" indefiniteness of the word borer; borers confined to particular trees according to species; relations between Clytus [= Cyllene] pictus and C. [= C.] robiniw; habits of and means against canker-worms. See No. 954.
- 942. [RILEY, C. V.] The critic criticised. <Prairie Farmer, 16 March, 1867, [v. 35], n. s., v. 19, p. 169. S.-b. No. 2, p. 58.
  - Reply to B. D. Walsh's "The critic criticised;" insists upon the correctness of one criticism made; acknowledges incorrectness of another. See Nos. 222, 937, 939.
- 943. RILEY, C. V. [Solenobia.] < Prairie Farmer, 16 March, 1867, [v. 35], n. s., v. 19, p. 169. S.-b. No. 2, p. 58.
  - Answer to inquiry of J. C. Plumb; brief description of the larva of ? Solenobia; habits of the genus.
- 944. RILEY, C. V. Bark-lice. Their history, together with sundry remedies. <Prairie Farmer, 23 March, 1867, [v. 35], n. s., v. 19, p. 184. S.-b. No. 2, pp. 61-62. Extract: <Cultivator and Country Gentleman, 23 May, 1867, v. 29, p. 334. <Pract. Ent., April, 1867, v. 2, pp. 81-82.
  - Criticises several patent remedies for ravages of bark-lice, Coccidæ; ignorance of entomology amongst intelligent writers; natural history of Mytilaspis pomicorticis [= pomorum].
- 945. RILEY, C. V. The phlox-worm. < Prairie Farmer, 6 April, 1867, [v. 35], n. s., v. 19, p. 219, 2 figs. S.-b. No. 2, pp. 63, 64.
  - Describes and figures larva and imago of *Heliothis phloxiphaga*; describes pupa; seasons and habits.
- 946. RILEY, C. V. The potato-beetle. < Prairie Farmer, 6 April, 1867, [v. 35], n. s., v. 19, p. 219. S.-b. No. 2, p. 64.
  - Answer to inquiries of H. Tilden; Doryphora decemlineata remains permanently in regions invaded by it; hibernates as an imago under ground.

947. RILEY, C. V. Meadow-worms. < Prairie Farmer, 6 April, 1867, [v. 35], n. s., v. 19, p. 219. S.-b. No. 2, p. 64.

Answer to inquiry of B. S.; habits of Tipula in all stages.

- 948. RILEY, C. V. Clover-worms. < Prairie Farmer, 1867, [v. 35], n. s., v. 19, 20 April, pp. 260–261, 10 figs.; 27 April, p. 279. S.-b. No. 2, pp. 67, 68.
  - Habits and ravages of *Pyralis olinalis* [= Asopia costalis]; figures and detailed descriptions of larva, pupa, cocoon, and imago.
- 949. RILEY, C. V. The apple-leaf crumpler. <Prairie Farmer, 27 April, 1867, [v. 35], n. s., v. 19, p. 279, 4 figs. S.-b. No. 2, p. 68. Answer to inquiry of A. H.; description of pupa, figure of larva-case and imago of *Phycita nebulo* [= Acrobasis indiginella]; habits and means against the same.
- 950. RILEY, C. V. Cocoons on the flowering ash. <Prairie Farmer, 27 April, 1867, [v. 35], n. s., v. 19, p. 279. S.-b. No. 2, p. 68. Answer to inquiry of A. B. Pierce; descriptions of larva, cocoon, and imago of Attacus promethea; food-plants of larva; method of emergence from cocoon.
- 951. RILEY, C. V. Scarred apple-trees. Prairie Farmer, 27 April, 1867, [v.35], n. s., v. 19, p. 279. S.-b. No. 2, p. 68.

  Answer to inquiry of P. M. Williamson; descriptions of the injuries to apple-trees caused by Tettigonia sp., Coccus harrisii [=Chionaspis furfurus], and Mytilaspis pomicorticis [=pomornm].
- 952. RILEY, C. V. Aphides. < Prairie Farmer, 18 May, 1867, [v. 35,], n. s., v. 19, p. 332. S.-b. No. 2, p. 73.

  Answer to inquiry of J. Taylor; color and propagation of Aphis mali; means against the same.
- 953. RILEY, C. V. Tree-cricket. Prairie Farmer, 18 May, 1867, [v. 35], n. s., v. 19, p. 332. S.-b. No. 2, p. 73.

  Answer to inquiry of A. N. Prentiss; habits of *Œcanthus niveus*.
- 954. RILEY, C. V. Note. < Prairie Farmer, 18 May, 1867, [v. 35], n. s., v. 19, p. 332. S.-b. No. 2, p. 73.

  Correction of No. 941; criticism unfounded.
- 955. RILEY, C. V. The strawberry-worm, *Emphytus maculatus* Norton. < Prairie Farmer, 25 May, 1867, [v. 35], n. s., v. 19, p. 348, 9 figs. S.-b. No. 2, p. 72.
  - Descriptions and figures of all stages, geographical distribution, seasons, habits, and oviposition of and means against *Emphytus* [=*Harpiphorus*] maculatus.
- 956. RILEY, C. V. White-pine worm: *Lophyrus abbotii*. < Prairie Farmer, 25 May, 1867, [v. 35], n. s., v. 19, p. 348, 7 figs. S.-b. No. 2. p. 72.
  - Description of image of Lophyrns abbotii; figures larva, pupa, cocoon, Q image and Z and Q antennæ; habits and scasons of larvæ.
- 957. [RILEY, C. V.] Stag-beetle. < Prairie Farmer, 25 May, 1867, [v. 35], n. s., v. 19, p. 348. S.-b. No. 2, p. 72.

  Answer to inquiry of S. Barrier; habits of Lucanus elaphus.

- 958. [RILEY, C. V.] The Curculio. < Prairie Farmer, 1 June, 1867, [v. 35], n. s., v. 19, p. 368. S.-b. No. 2, p. 73.
  - Successful results from the use of machines for destroying Conotrachelus nenuphar; this insect hibernates in the image state.
- 959. RILEY, C. V. Fifteen-spotted lady-bird. <Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
  - Answer to inquiry of A. B. Knowlton; food, variable coloration of imago, and usefulness of Mysia [Anatis] 15-punctata.
- 960. RILEY, C. V. Cherry Aphis. < Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
  - Answer to inquiry of G. Lee; habits, ravages of and means against Myzus cerasi.
- 961. RILEY, C. V. Tree-cricket. < Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
  - Eggs of *Œcanthus niveus* deposited in raspberry cancs cause the death of the wood above them.
- 962. RILEY, C. V. Apple-tree borer. < Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
  - Answer to inquiry of A. B. Campbell; commends D. B. Wier's remedy against the apple-tree borer;  $Saperda\ bivittata\ [=candida]$  goes through its transformations in two years, though commonly believed to require three years.
- 963. RILEY, C. V. Insects affecting apple-tree roots. < Prairie Farmer, 15 June, 1867, [v. 35], n. s., v. 19, p. 397. S.-b. No. 2, p. 100.
  - Letter from O. B. Galusha, with answer; descriptions of young and mature wingless individuals of the root-inhabiting form, Pemphigus pyri, of Schizoneura lanigera; habits, seasons, and reproduction of this form; its gall-making and means against it; description of larva of Cecidomyia species found with the lice; and of larva and image of Mycetophila persica [n. sp.?]; seasons of the latter; larva of Saperda calcarata bores in roots of apple; larva of Helops micans feeds on decaying apples; Julus [Spirobolus] marginatus infested with Gamasus juloides.
- 964. RILEY, C. V. A chapter on cut-worms. <Prairie Farmer, 22 June, 1867, [v. 35], n. s., v. 19, pp. 413-414, 7 figs. S.-b. No. 2, pp. 79-80.
  - Extract from J. Townley's "Do cut-worms destroy tree buds?". Buds of fruit trees destroyed by the larvæ of Agrotididæ; other ravages and means against the same; descriptions of the larvæ of Agrotis subgothica [= A. herilis and A. trieosa], A. telifera [= A. ypsilon], and Celæna [= Hadena] renigera; description of A. cochranis n. sp. [= A. messoria]; figures larva and imago of A. cochranis, A. telifera, and Celæna renigera; and imago of A. subgothica; habits, seasons, and vernacular names of Agrotididæ.
- 965. [RILEY, C. V.] Strawberry-worm. < Prairie Farmer, 22 June, 1867, [v. 35], n. s., v. 19, p. 414. S.-b. No. 2, p. 80.
  - Answer to inquiry of A. R. Whitney; geographical distribution of *Emphytus* [= Harpiphorus] maculatus.
- 966. RILEY, C. V. Insects stripping the bur-oak. <Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, p. 81. Answer to inquiry of A. B. Price; habits of Lachnosterna pilosicollis [= tristis.]

- 967. RILEY, C. V. Borers. < Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, p. 81.
  - Answer to inquiry of J. Wentworth; means against Clytus [== Cyllene] robiniw and Xyleutes [== Cossus] robiniw.
- 968. RILEY, C. V. Potato-beetle. <Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, pp. 81–82.
  - Answer to inquiries of J. L. W. and G. L. Merriwether; *Doryphora* 10-lineata three-brooded; its occurrence at Shipman, Ill.
- 969. [RILEY, C. V.] Smith's patent Curculio trap. <Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, p. 82. Communication from N. C. Coffman, with reply; condemns J. Smith's Cur-
- enlio trap.

  970. RILEY, C. V. [Aphis ribis.] < Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
  - Answer to inquiry of C. J. Eekhart; means against Myzus ribis.
- 971. RILEY, C. V. Mantis carolina. < Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.

  Answer to communication of J. H. Graves; eggs of Mantis [= Phasmomantis] carolina found in Ogle County, Ill.
- 972. RILEY, C. V. Lappet caterpillars on the apple. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.

  Answer to communication of Perkins and Congdon; description of the larva. pupa, cocoon, and image of Gastropacha [== Tolype] velleda.
- 973. RILEY, C. V. Apple-bark lice on pears. < Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.

  Mytilaspis pomicorticis [= pomorum] on the fruit of pear-trees; said to occur on eurrants, plum, and black oak.
- 974. RILEY, C. V. Currant bush borer. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.

  Answer to inquiry of H. B. Kinne; habits, description, and means against Egerna tipuliformis.
- 975. RILEY, C. V. Apple-leaf crumpler. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S. b. No. 2, p. 81.

  Answer to inquiry of H. C. Clock; habits and means against Physita nebulo [= Acrobasis indiginella].
- 976. RILEY, C. V. Tomato-stalk borer. < Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.

  Answer to inquiry of O. G. Nevins; food-plants of Gortyna nitela.
- 977. RILEY, C. V. A few errors corrected. < Wisc. Farmer, 17 August, 1867. S.-b. No. 2, p. 83.

  Habits of Doryphora 10-lineata and of Carpocapsa pomonella.
- 978. RILEY, C. V. Curculio. <Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.

  Answer to inquiry of J. Shearer; means against Conotrachelus nenuphar.
- 979. RILEY, C. V. Hop-vine caterpillars. < Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.
  - Communication from J. H. Graves, with answer; Mantis [= Phasmomantis] carolina breeds as far north as Ogle County, Ill. Description of larva and imago of Hypena humuli [= scabra]; means against it.

- 980. RILEY, C. V. Wheat-worms. < Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82. Communication from C. Campbell, with answer; description of larva and
  - Communication from C. Campbell, with answer; description of larva and image and habits of Pyralis [= Asopia] farinalis; ravages of Tenebric molitor; means against both species.
- 981. RILEY, C. V. [Root-borer.] < Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.

  Communication from S. T. Kelsey, with answer; ravages of an unknown eerambyeid larva which destroys the roots of various plants.
- 982. RILEY, C. V. Bark-lice on the pear. < Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.

  Letter from T. D. Plumb, with answer; Mytilaspis pomicorticis [= pomorum] lives on fruit of pear and crab-apple; the scale a secretion; extent of injuries caused by this insect.
- 983. RILEY, C. V. A nuisance made useful. < Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.

  Means against Doryphora 10-lineata discredited.
- 984. RILEY, C. V. Strawberry leaf-roller. < Prairie Farmer, 5 October, 1867, [v. 36], n. s., v. 20, p. 212. S.-b. No. 2, p. 100.

  Answer to inquiry of N. R. Strong; Anchylopera [= Phoxopteris] fragariæ injures strawberry leaves; larvæ of Selandria [= Monostegia] rosæ also eat leaves of the strawberry.
- 985. RILEY, C. V. False caterpillars on the pine. < Prairie Farmer,
  5 October, 1867, [v. 36], n. s., v. 20, p. 212. S.-b. No. 2, p. 101.
  Answer to inquiry of A. S. Fuller; habits and description of Lophyrus lecontei.
- 986. RILEY, C. V. An unknown worm. < Prairie Farmer, 5 October, 1867, [v. 36], n. s., v. 20, p. 212. S.-b. No. 2, p. 101. Extract from Beaver Dam Citizen, with comments; habits and description of Eristalis sp.
- 987. [RILEY, C. V.] Bark-louse. < Prairie Farmer, 19 October, 1867, [v. 36], n. s., v. 20, p. —. S.-b. No. 2, p. 75.

  Benzine and soap as a means against bark-lice.
- 988. [RILEY, C. V.] Editorial excursion to the Rocky Mountains. <Prairie Farmer, 7 December, 1867, [v. 36], n. s., v. 20, pp. 353–354. S.-b. No. 2, pp. 112–113.

  List of plants, insects, and mammals observed.
- 989. RILEY, C. V. Bark-lice. < Prairie Farmer, 21 December, 1867, [v. 36], n. s., v. 20, p. 389. S.-b. No. 2, p. 112.

  Answer to inquiries of G. Backster and J. C. Cobbey; means against Mytilaspis pomicorticis [= pomorum].
- 990. RILEY, C. V. Root Aphis. < Prairie Farmer, 21 December, 1867, [v. 36], n. s., v. 20, p. 389. S.-b. No. 2, p. 112.

  Answer to inquiry of J. M. Jordan; means against the root and stem forms of Schizoneura lanigera.
- 991. [RILEY, C. V.] The Colorado potato-beetle. <Prairie Farmer, 21 December, 1867, [v. 36], n. s., v. 20, p. 389. S.-b. No. 2, p. 112. Communications from C. W. Murtfeldt asserting the possession of poisonous qualities by the larvæ of *Doryphora* 10-lineata.

- 992. RILEY, C. V. Cut-worm. Fall and spring plowing. <Moore's Rural New Yorker, ———, 1867. S.-b. No. 2, p. 94. Criticism of article by Agricola.
- 993. RILEY, C. V. Entomology. <Prairie Farmer Annual [No. 1 for 1868], 1867, pp. 53-59, 6 figs. S.-b. No. 2, pp. 125-126; No. 14, pp. 216-219.
  - Descriptions and figures of larva, pupa, and imago of Coptocycla [= Cassida] bivittata; habits, seasons, and means against it; list of Cassididæ injurious to sweet-potato. Descriptions of larva, nidus, and imago of Desmia maculalis, figures pupa; habits and seasons of and means against it. Figures Colaspis flavida; describes its supposed habits. Food-plants of Heliothis armigera. Figures larva and imago of Gortyna nitela; its food-plants, seasons, and hibernation. Figures larva and imago of Heliothis phlogophagus; synonymy, geographical distribution, and means against it; remarks on the balance of nature. Figures larva, pupa, eocoon, and imago of Asopia costalis; its synonymy and ravages.
- 994. RILEY, C. V. Bark-lice. < Prairie Farmer, 15 February, 1868, [v. 37], n. s., v. 21, p. 100. S.-b. No. 2, p. 118.
  - Answer to inquiry of J. Hawkins; natural limitation and parasites of *Mytilaspis pomicorticis* [=pomorum]; it attacks healthy and unhealthy trees; means against it; experience with washes.
- 995. RILEY, C. V. Potato beetle. < Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S.-b. No. 2, p. 119; No. 3, p. 58.
  - Answer to inquiry of F. T. Moore; invention of a machine for killing *Dory-phora* 10-lineata; hand-picking and heavy mulching the most available remedies.
  - 996. RILEY, C. V. Apple-tree plant-lice. <Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S.-b. No. 2, p. 119; No. 3, p. 58.
    - Letter from L. M., with answer; habits of and means against Aphis mali.
  - 997. RILEY, C. V. Apple-root blight. < Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S. b. No. 2, p. 119; No. 3, p. 58.
    - Answer to inquiry of C. S. J.; Schizoneura lanigera not the eause of "rotten root."
  - 998. RILEY, C. V. Apple leaf-crumpler. < Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S.-p. No. 2, p. 119; No. 3, p. 58.
    - Answer to inquiry of J. M. Pearson; means against Phycita nebulo [= Acrobasis indiginella].
  - 999. RILEY, C. V. Tree-cricket. < Prairie Farmer, 14 March, 1868, [v. 37], n. s., v. 21, p. 164. S.-b. No. 2, p. 120; No. 3, p. 58.
    - Letter from J. J. Huggins, with answer; place of oviposition of *Œcanthus niveus*; list of plants in which this species oviposits.
- 1000. RILEY, C. V. Egg-masses and cocoons on apple-trees. < Prairie Farmer, 14 March, 1868, [v. 37], n. s., v. 21, p. 164. S.-b. No. 2, p. 120; No. 3, p. 58.
  - Answer to inquiry of a correspondent; description of egg-masses and of larva of Orgyia lcucostigma; beneficial influence and means of encouraging parasites.

1001. RILEY, C. V. Hop insects; Hop Aphis. < Prairie Farmer, 21 March, 1868, [v. 37], n. s., v. 21, p. 184. S.-b. No. 3, p. 58.

Brief account of and means against Human humali [— scalara] and Phorodon

Brief account of and means against Hypena humuli [= scabra] and Phorodon humuli.

1002. RILEY, C. V. Supposed eggs of the preying Mantis. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.

Answer to inquiry of J. H. Graves; cocoons of *Rhogas* sp. attached in a mass to twigs of an apple-tree.

- 1003. RILEY, C. V. Oak-tree borer. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
  - Answer to inquiries of E. G. Mygatt; habits and food-plants of Xylentes. [= Cossus] robiniæ; means against it.
- 1004. RILEY, C. V. Maple-bark lice. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S. b. No. 2, p. 121; No. 3, p. 59.

Lecanium sp. found on twigs of sugar-maple.

- 1005. RILEY, C. V. Eggs of the katydid. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
  - Answer to inquiry of W. Colwell; habits and food-plants of *Platyphyllum* [= Cyrtophyllus] concavus.
- 1006. RILEY, C. V. Eggs of tree-cricket in raspberry canes. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
  - Letter from E. T. Nelson, with answer; oviposition of *Ecanthus niveus* in raspberry canes; means against this insect.
- 1007. RILEY, C. V. Bark-lice. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
  - Answer to inquiry of C. D. Robinson; means against Mytilaspis pomicorticis [=pomorum].
- 1008. RILEY, C. V. Bark-lice again; the native species. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
  - Letter from N. Coleman, with answer; comparative characters of Mytilaspis pomicorticis [= pomorum] and Diaspis harrisii [= Chionaspis furfurus]; food-plants of the latter.
- 1009. RILEY, C. V. Dahlia-stalk borer. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.

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- 1010. RILEY, C. V. Apple-worm. < Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.

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- 1011. RILEY, C. V. False caterpillars on the Scotch and Austrian pines. <Prairie Farmer, 2 May, 1868, [v. 37], n. s., 21, p. 285, fig.

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  - Description and figures of larva, cocoon and imago, and of male antenna of Lophyrus lecontei; food-plants and habits of larva; value of technical science.
- 1012. RILEY, C. V. Prevention of bark-lice. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.

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- 1013. RILEY, C. V. Beetles in stomach of meadow-lark. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
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- 1014. RILEY, C. V. Beetle on sugar-maple. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.

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- 1015. RILEY, C. V. White worms in wells. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60. Fish or frogs placed in wells will free them from worms.
- 1016. RILEY, C. V. Tanzy for borers. < Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.

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- 1017. RILEY, C. V. Peach-borer. < Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.

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- 1018. RILEY, C. V. Black grape vine caterpillars. < Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60. Descriptions of larva and image of *Thyreus abbotii*; the abundance of parasites prevents serious injury by the larva.
- 1019. RILEY, C. V. The potato-beetle. <Cultivator and Country Gentleman, 21 May, 1868, v. 31, p. 378.</p>
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- 1020. RILEY, C. V. The May-beetle; white grub. <Journ. of Agric., 1868, 4 figs. S.-b. No. 3, p. 10.</li>
  Habits, food-plants, enemies, and means against Lachnosterna quercina [=fusca]; figures the larva, pupa, and imago of the same.
- 1021. RILEY, C. V. Canker-worm. < Colman's Rural World, 1868. S.-b. No. 3, p. 16.

  Habits of and means against Anisopteryx [= Paleacrita] vernata.
- 1022. RILEY, C. V. The apple-worm or codling-moth. <Colman's Rural World, 1868, fig. S. b. No. 3, p. 16.

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- 1023. RILEY, C. V. Remedy for the apple-borer. <Colman's Rural World, 1868. S.-b. No. 3, p. 16.

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- 1024. RILEY, C. V. Grape-vine hoppers. < Colman's Rural World, 1868. S. b. No. 3, p. 16.

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- 1025. RILEY, C. V. Thousand-legged worm. < Colman's Rural World, 1868. S.:b. No. 3, p. 16.
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- 1026. RILEY, C. V. Honey-locust seed-weevil. < Prairie Farmer, 20 June, 1868, [v. 37], n. s., v. 21, p. 397. S.-b. No. 3, p. 59. Habits, description of, and means against Spermophagus robiniæ.
- 1027. RILEY, C. V. Potato-beetle. <Prairie Farmer, 20 June, 1868, [v. 37], n. s., v. 21, p. 397. S.-b. No. 3, p. 59.
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- 1028. RILEY, C. V. Large moth on apple-tree. <Prairie Farmer, 27 June, 1868, [v. 37], n. s., v. 21, p. 410. S.-b. No. 3, p. 60. The larva of Attacus cccropia spins its cocoon on apple and other trees.
- 1029. RILEY, C. V. Will unimpregnated eggs hatch? < Prairie Farmer, 27 June, 1868, [v. 37], n. s., v. 21, p. 410. S.-b. No. 3, p. 60.
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- 1031. [RILEY, C. V.] [Pear-slug and current-worm.] <Prairie Farmer, 27 June, 1868, [v. 37], n. s., v. 21, p. 410. S.-b., No. 3, p. 60. Means against Selandria [= Eriocampa] cerasi and Nematus ventricosus [=ri-besii].
- 1032. RILEY, C. V. What becomes of bumble-bees? < Cultivator and Country Gentleman, 2 July, 1868, v. 32, p. 18.

  Answer to Anna's "Bumble-bees;" only the queens of Bombus survive the winter; new colonies formed by hibernated queens.
- 1033. RILEY, C. V. Large gray straight-horned snout-beetle. <Prairie Farmer, 4 July, 1868, [v. 38], n. s., v. 22, p. 2–3, figs. S.-b. No. 3, pp. 31, 56.
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- 1034. RILEY, C. V. The seventeen-year Cicada. < Prairie Farmer, 4
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- 1035. RILEY, C. V. Raspberry canes dying. <Prairie Farmer, 11 July,
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- 1036. RILEY, C. V. Bag-worms. <Prairie Farmer, 11 July, 1868, [v. 38], n. s., v. 22, p. 10. S.-b. No. 3, pp. 31, 56.

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- 1038. RILEY, C. V. Apple-borer and root Aphis. < Prairie Farmer, 11 July, 1868, [v. 38], n. s., v. 22, p. 10. S.-b. No. 3, pp. 32, 56. Answer to inquiry of W. colwell; ravages of Saperda bivittata [=candida] and of Schizoneura lanigera.
- 1039. RILEY, C. V. Evergreen plant-lice. <Prairie Farmer, 11 July, 1868, [v. 38], n. s., v. 22, p. 10. S.-b. No. 3, pp. 32, 56.

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- 1042. [RILEY, C. V.] A corn Curculio < Prairie Farmer, 25 July, 1868, [v. 38], n. s., v. 22, p. 26. S.-b. No. 3, p. 33. Communication from L. V. Smith, with answer; seasons and ravages of Sphenophorus sculptilis.
- 1043. RILEY, C. V. Ephemera flies; a hard story. < Prairie Farmer, 15 August, 1868, [v. 38], n. s., v. 22, p. 50. S.-b. No. 3, pp. 36, 57. Extract from Peoria (Ill.) Transcript, with letter of J. Cochrane, of Havana, Ill.; notes on the above; appearance of swarms of Palingenia [= Hexagenia] bilineata in Illinois and of other may-flies in Europe; life-history of Ephemeridæ.
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- 1047. RILEY, C. V. Corn-worms. < Prairie Farmer, 15 August, 1868, [v. 38], n. s., v. 22, p. 50. S.-b. No. 3, p. 36.

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- 1050. RILEY, C. V. Swarms of butterflies. < Prairie Farmer, 26 September, 1868, [v. 38], n. s., v. 22, p. 98.
- 1051. RILEY, C. V. Worms feeding on the hawthorn. < Prairie Farmer, 26 September, 1868, [v. 38], n. s., v. 22, p. 98.
- 1052. RILEY, C. V. Twig borers, sack-bearers, etc. < Prairie Farmer.
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- 1053. RILEY, C. V. Oil beetles. < Prairie Farmer, 19 December, 1868, [v. 38], n. s., v. 22, p. 194.
- 1054. RILEY, C. V. Apple-tree caterpillars. < Prairie Farmer, 19 December, 1868, [v. 38], n. s., v. 22, p. 194.
- 1055. RILEY, C. V. Twigs punctured by periodical Cicada. < Prairie Farmer, 19 December, 1868, [v. 38], n. s., v. 22, p. 194.
- 1056. RILEY, C. V. Report of committee on entomology. <Trans. Ill. Hortic. Soc. for 1867, 1868, n. s., v. 1, pp. 105-107, figs. 1-8.
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- 1057. RILEY, C. V. Entomology. < Prairie Farmer Annual [No. 2 for 1869], 1868, pp. 30-41, 6 figs. S.-b. No. 14, pp. 220-226.
  - Directions for collecting and preserving insects; descriptions of apparatus and cabinets; means against cabinet pests; descriptions and figures of all stages, except egg, of Lophyrus abbotii and L. lecontei; habits and foodplants of and means against both species; figures of eggs, pupe, and imago of Cicada [= Tibicen] septendecim and of twig punctured by imago; dates and localities of occurrence of this species and of C. [= T.] tredecim; C. [= T.] cassinii a form of this insect; figures larva, puparium, and imago of Cephalemyia [= Estrus] ovis; habits and ravages of and means against it; imago viviparous in the nostrils of sheep.
- 1058. RILEY, C. V. The American Meromyza, Meromyza americana, Fitch. Attacking wheat just before it ripens. < Moore's Rural New Yorker, 30 January, 1869, v. 20, p. 71, fig. S.-b. No. 3, p. 83.
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| 1061. | RILEY, C. V. Native bark-lice on apple-trees. < Prairie Farm  | ner,       |

17 April, 1869, [v. 39], n. s., v. 23, p. 122, 1 fig. S.-b. No. 3, p.

Answer to inquiry of T. B. Gardner; life history of and means against Diaspis harrisii [= Chionaspis furfurus]; figure of the same.

1062. RILEY, C. V. Curculio. < Prairie Farmer, 17 April, 1867, [v. 39], n. s., v. 23, p. 122. S.-b. No. 3, p. 57.

Answer to inquiry of James Weed; habits of and means against Conotrachelus nenuphar.

1063. RILEY, C. V. Cherry-tree borers. < Prairie Farmer, 17 April, 1869, [v. 39], n. s., v. 23, p. 122. S.-b. No. 3, p. 57.

Answer to inquiry of Onargo Horticultural Society; larvæ of Buprestis [=Directa] divaricata and of Trochilium sp., injurious to cherry-trees; softmaple attacked by T. [= Egeria] accrni; means against these insects.

- 1064. RILEY, C. V. White-grub fungus. < Prairie Farmer, 15 May, 1869, [v. 39], n. s., v. 23, p. 154. S.-b. No. 3, p. 76.
  - Letter from D. W. Tindall, with answer; ravages of Lachnosterna quercina [=fusca] in Clinton County, Mo., in 1868; Torrubia growing on the larvæ in 1869.
- 1065. RILEY, C. V. The canker-worm, Anisopteryx vernata Peck. <Moore's Rural New Yorker, 29 May, 1869, v. 20, p. 345, figs. S.-b. No. 3, p. 73.
  - Description, figures, and natural history of canker-worms; the two species are confounded.
- 1066. RILEY, C. V. The seed corn maggot, Anthomyia zeas, Riley. Destroying the seed after it is planted. < Moore's Rural New Yorker, June, 1869, fig. S. b. No. 3, p. 81. Advance print, with changes: <1st Ann. Rept. State Ent. Mo., March, 1869, pp. 154–156, figs. 86–87.
  - See No. 1059 for synopsis of contents.
- 1067. RILEY, C. V. Cherry-tree plant-lice. <Moore's Rural New Yorker, 10 July, 1869, v. 20, p. 443. S.-b. No. 3, p. 83.

  Answer to inquiry of G. J. Magee; means against Aphis [= Myzus] cerasi.
- 1068. RILEY, C. V. Gooseberry span-worms. < Moore's Rural New Yorker, 10 July, 1869, v. 20, p. 443. S.-b. No. 3, p. 83.
  - Letter from A. Yancey, with answer; occurrence of Eufitchia ribearia in Iowa; habits and means against it; habits of and influence of weather on Blissus leucopterus; scarcity of Doryphora 10-lineata in Iowa.
- 1069. RILEY, C. V. Apple-leaf crumpler mistaken for Curculio. <Prairie Farmer, 10 July, 1869, [v. 40], n. s., v. 24, p. 218, fig. S.-b. No. 3, p. 80.
  - Letter from B. T. Taylor; improper use of the word Curculio; figures larvacase and imago of *Phycita nebulo* [= Acrobasis indiginella]; means against it; outline figure of Conotrachelus nenuphar.
- 1070. RILEY, C. V. Peach-tree borer. <Prairie Farmer, 10 July, 1869, [v. 40], n. s., v. 24, p. 218. S.-b. No. 3, p. 80.
  - Answer to inquiry of C. Allen; habits of and means against Egeria [=Sannina] exitiosa.
- 1071. RILEY, C. V. To protect plums from Curculio. Prairie Farmer, 10 July, 1869, [v. 40], n. s., v. 24, p. 218. S.-b. No. 3, p. 80.
  - Answer to inquiry of H. H. S.; recommends the collection of the image of Conotrachelus nenuphar by jarring.
- 1072. RILEY, C. V. White-grub; information wanted. <Prairie Farmer, 28 August, 1869, [v. 40], n. s., v. 24, p. 274, 4 figs. S.-b. No. 3, p. 95.
  - Letter from A.T.V., with answer; habits of and means against *Lachnosterna* quercina [=fusca]; figures of larva and imago.
- 1073. RILEY, C. V. Unknown corn pest. < Prairie Farmer, 28 August, 1869, [v. 40], n. s., v. 24, p. 274. S.-b. No. 3, p. 95.
  - Letter from E. B. Hickey, with answer; ravages of cut-worms and of an unknown pest on maize; brief description and habits of the latter.

- 1074. RILEY, C. V. Larva of the grape vine flea-beetle. < Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, pp. 100, 103.
  - Answer to inquiry of D. D. Vosburgh; habits, ravages, and means against Graptodera [= Haltica] chalybea.
- 1075. RILEY, C. V. Rose bug. < Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, pp. 100, 103.
  - Answer to inquiry of a subscriber; description of imago, transformations of, and means against *Macrodactylus subspinosus*.
- 1076. RILEY, C. V. Large green caterpillar on the apple. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100.
  - Answer to inquiry of S. E. A. Palmer; descriptions of larva and image of Attacus cecropia; its habits and seasons.
- 1077. RILEY, C. V. Conical galls on leaves of wild grape-vine. 'Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100.
  - Answer to inquiry of D. McClaine; description of galls of Cecidomyia vitisviticola; characters of the larvæ of Cecidomyia.
- 1078. RILEY, C. V. A strange bug. < Moore's Rural New Yorker, 28

  August, 1869, v. 20, p. 555. S. b. No. 3, p. 100; No. 4, p. 3.

  The insects described in North Carolina's "A strange bug," were probably 

  Psocus venosus; habits of the genus Psocus.
- 1079. RILEY, C. V. Currant-worms and black-currants. < Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100; No. 4, p. 3.
  - Critical review of Addi on currant-worms; in North America three species of larvæ feed on the leaves of currants, and two species of borers live within the stem.
- 1080. RILEY, C. V. Curculio. < Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100; No. 4, p. 3. Commendation of an editorial criticism of Northwest's article on the Curculio.
- 1081. [RILEY, C. V.] Insects injurious to the grape-vine. [No. 1.] <Amer. Ent., August, 1869, v. 1, pp. 231–234, figs. 169–173. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 87–91, figs. 60–63.
  - Treats of *Prionus laticollis* and *P. imbricornis*. See No. 1127 for synopsis of contents.
- 1082. [RILEY, C. V.] Insects infesting the sweet-potato. <Amer. Ent., August, 1869, v. 1, pp. 234–238, figs. 174–181. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 56–64, figs. 26–38.
  - Treats of tortoise-beetles, Cassidida. See No. 1127 for synopsis of contents.
- 1083. RILEY, C. V. The borers. <Western Rural, September, 1869. S.-b. No. 4, p. 2.
  - Means against Egeria cucurbitæ [== Melittia ceto].

- 1084. RILEY, C. V. Supposed bark-lice eggs in Missouri. < Prairie Farmer, 4 September, 1869, [v. 40], n. s., v. 24, p. 282. S.-b. No. 3, p. 95.
  - Letter from J. Reed, with answer; eggs of a moth mistaken for those of *Mytilaspis pomicorticis* [= pomorum]; the latter unknown in Missouri.
- 1085. RILEY, C. V. New York weevil on apple-trees. < Prairie Farmer, 4 September, 1869, [v. 40], n. s., v. 24, p. 282, 3 figs. S. b. No. 3, p. 95.
  - Letter from R. M. Guy, with answer; figures of larva and imago, description of imago, geographical distribution, methods of oviposition, food-plants, and means against *Ithycerus noveboracensis*.
- 1086. [RILEY, C. V.] Insects injurious to the grape-vine. No. 2. < Amer. Ent., September-October, 1869, v. 2, pp. 22-24, figs. 12-16. Reprint, with slight changes. < 2d Ann. Rept. State Ent. Mo., March, 1870, pp. 71-73, figs. 44-48.
  - Treats of Charocampa pampinatrix [= Ampelophaga myron]; see No. 1127 for synopsis of contents.
- 1087. RILEY, C. V. Larva of the imperial moth. < Prairie Farmer, 9 October, 1869, [v. 40], n. s., v. 24, p. 322. S.-b. No. 3, p. 92.
  - Letter of C. H. Thayer, with answer; description of larva, pupa, and imago of Ceratocampa [= Eacles] imperialis; food-plants of the same and of C. [= Citheronia] regalis.
- 1088. RILEY, C. V. Apple snout-beetle or four-humped Curculio. < Prairie Farmer, 9 October, 1869, [v. 40], n. s., v. 24, p. 322. S.-b. No. 3, p. 92.
  - Letter from R. W. Gandy, with answer; habits and description of Anthonomus quadrigibbus; recommends jarring.
- 1089. RILEY, C. V. That venomous potato-worm! < Moore's Rural New Yorker, 20 November, 1869, v. 20, p. —. S.-b. No. 3, pp. 107; 112.
  - Critical review of several recent articles upon tomato-worms; structure and harmlessness of larvæ of Sphingida; geographical distribution of Sphinx [=Protoparce] carolina and S. quinque maculata [=P. celeus].
- 1090. [RILEY, C. V.] The bag-worm, alias basket-worm, alias dropworm, Thyridopteryx ephemeræformis, Haw. <Amer. Ent., November, 1869, v. 2, pp. 35–38, fig. 24.
  - Geographical distribution, food-plants, seasons, transformations, parasites, copulation, and oviposition of and means against *Thyridopteryx ephemeræ-formis*; figures and descriptions of larva, larva-cases, pupa, and imago; description of eggs; abodes constructed by insects.
- 1091. [RILEY, C. V.] Insects injurious to the grape-vine. No. 3. < Amer. Ent., November, 1869, v. 2, pp. 54-55, figs. 33-35. Reprint, with slight changes. <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 74-76, figs. 49-51.
  - Treats of Philampelus achemon; see No. 1127 for synopsis of contents.
- 1092. RILEY, C. V. The saddle-back caterpillar. < Moore's Rural New Yorker, 4 December, 1869, v. 20, p. —, fig. S.-b. No. 3, p. 103.
  - Letters from A. W. Baker and G. T. Cost, with answer; figures and characterization of the larva of *Empretia stimulea*; food-plants, urticating properties, and transformations; description of the image.

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- - Habits and place of oviposition of Agrotis inermis [=saucia]; description of its eggs and larvæ.
- 1097. RILEY, C. V. That glow-worm. < Cultivator and Country Gentleman, 6 January, 1870, v. 35, p. 5, fig. S.-b. No. 4, p. 23. Reprint: < Amer. Ent., October, 1880, v. 3, n. s., v. 1, p. 254, fig.
  - Figures larva and imago of *Photuris peuusylvanica*; *Photinus pyralis* also luminous in larval and adult stages; comparison with *Lampyris noctiluca*.
- 1098. [RILEY, C. V.] In memoriam. <Amer. Ent., December, 1869– January, 1870, v. 2, pp. 65–68. Biographical and obituary notice of B. D. Walsh.
- 1099. [RILEY, C. V.] The harlequin cabbage-bug, Strachia histrionica, Hahn. <Amer. Ent., December, 1869-January, 1870, v. 2, pp. 79-80, fig. 56.
  - Enumeration of the enemies of the eabbage in the United States; methods of their injury; importation and spread of some species; figures of the imago; description of eggs, habits, geographical distribution, seasons, and odors of Strachia [= Murgantia] histrionica; extract from G. Linceeum's "Texan cabbage-bug."
- 1100. [RILEY, C. V.] An entomologist caught napping. <Amer. Ent., December, 1869-January, 1870, v. 2, p. 84.
  - Criticism of the view that trees, grasses, or any other particular forms of vegetation are the natural coverings of the earth; this criticism applied especially to John Curtis.
- 1101. [RILEY, C. V.] Poisonous qualities of the Colorado potato-bug. <a href="mailto:Amer.">Amer. Ent.</a>, December, 1869–January, 1870, v. 2, pp. 85–86. Extract from "Winona Republican," with remarks upon the poisonous nature of the blood of *Doryphora 10-lineata*.
- 1102. [RILEY, C. V.] Insects injurious to the grape-vine. No. 4. -<Amer. Ent, December, 1869-January, 1870, v. 2, pp. 89-90, figs. 58-59. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 76-78, figs. 52-53.
  - Treats of Philampelus satellitia [= pandorus]; see No. 1127 for synopsis of contents.

- 1103. [RILEY, C. V.] Toads vs. bugs. < Amer. Ent., December, 1869-January, 1870, v. 2, p. 91.
  - Translation of extracts from Fogt's "Noxious and beneficial animals;" existence of a commerce in toads between France and England; nsefulness, tameness, and gratitude of toads.
- 1104. [RILEY, C. V.] The tomato-worm again. <Amer. Ent., December, 1869-January, 1870, v. 2, pp. 91-92.
  - Reprint, with comments, of article entitled "The tomato-worm," from Syracuse Standard; absurd nature of newspaper accounts of insects.
- 1105. [RILEY, C. V.] Mr. Walsh's successor. <Amer. Ent., December, 1869-January, 1870, v. 2, pp. 92-93.
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- 1106. [RILEY, C. V.] To our subscribers. <Amer. Ent., December, 1860-January, 1870, v. 2, p. 93.
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- 1107. [RILEY, C. V.] The Walsh entomological collection. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 93–94.
  - Statement of the conditions under which the Walsh collection of insects is to be sold; expression of preferences in regard to its disposition; extent and method of preservation of the collection.
- 1108. [RILEY, C. V.] A State entomologist for Minnesota. < Amer. Ent., December, 1869-January, 1870, v. 2, p. 94.
  - Commendation of resolutions passed by the Minnesota State Horticultural Society recommending the appointment of a state entomologist; promotion of entomological studies by appropriations from the several States.
- 1109. RILEY, C. V. [Field for the entomologist in the South.] < Amer. Ent., v. 2, December, 1869-January, 1870, p. 94; February, 1870, p. 121.
  - Extent and novelty of entomological work in the southern United States; J. P. Stelle at work in this field.
- 1110. [RILEY, C. V.] On our table. < Amer. Ent., December, 1869–January, 1870, v. 2, pp. 95, 96.
  - Notices of J. T. C. Ratzeburg's works on "Forest trees" and "Weeds of Germany and Switzerland."
- 1111. [RILEY, C. V.] Information wanted. <Amer. Ent., December, 1869-January, 1870, v. 2, p. 96.
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- 1112. [RILEY, C. V.] The Cecropia moth, Attacus cecropia, Linn. <Amer. Ent., February, 1870, v. 2, pp. 97–102, fig. 59 [bis]–67.
  - Descriptions and figures of larva, cocoon and image of Attacus cecropia; figure of pupa; descriptions of egg and of young larva at its several stages; nomenclature, food-plants, and parasites; its value as a silk-worm; figures and descriptions of Ophion macrurum, Exorista cecropiæ n. sp., and Chalcis [= Spilochalcis] mariæ n. sp.; figure of larva of Ophion macrurum and of cocoons of Cryptus nuncius; habits of these parasites; Exorista cecropiæ considered a variety of E. militaris [= Nemoræa leucaniæ].

- 1113. RILEY, C. V. Report of the committee on entomology. Read ... before the Missouri State Horticultural Society. < Amer. Ent., February, 1870, v. 2, pp. 106-109. Reprint: <2d Ann. Rept. State Ent. Mo.. March, 1870, pp. 5-8, 13-15. See No. 1127 for synopsis of contents.
- 1114. [RILEY, C. V.] Silk-worm eggs. < Amer. Ent., February, 1870, v. 2, p. 109.
  - Seventy-eight packages of silk-worm eggs, valued at \$800 per package and weighing two tons, shipped from Yokohama to France via California and the Pacific Railroad.
- 1115. RILEY, C. V. Imported insects and native American insects. <a href="#"><Amer. Ent., February, 1870, v. 2, pp. 110-112, fig. 72-75.</a> Reprint: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 8-12.
  - See No. 1127 for synopsis of contents.
- 1116. [RILEY, C. V.] The trumpet grape-gall, Vitis viticola O. S. <a href="#">< Amer. Ent., February, 1870, v. 2, pp. 113–114, fig. 76.</a>
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  - See No. 1127 for synopsis of contents.
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- 1125. [RILEY, C. V.] Parasitic cocoons. < Amer. Ent., February, 1870, v. 2, p. 128, fig. 91.
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  - Answer to inquiry of J. Huggins; habits and food-plants of *Tremex.columba*; description of imago; *Rhyssa* [= *Thalessa*] *lunator* destroys the larva.
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# 1128. [RILEY, C. V.] Mr. Walsh's portrait. <Amer. Ent., March, 1870, v. 2, p. 129.

Remarks accompanying the portrait of B. D. Walsh; resolutions passed on the death of Walsh by the London branch of the Entomological Society of Ontario; by the American Entomological Society, the Illinois State Horticultural Society, and by the Kansas State Horticultural Society.

# 1129. RILEY, C. V. The plum Curculio, Conotrachelus nenuphar Herbst. <Amer. Ent., March, 1870, v. 2, pp. 130-137, fig. 92.

Paper read before the Illinois State Horticultural Society at its 14th annual meeting; summary of established facts and discussion of mooted points in the life-history of Conotrachelus nenuphar; seasons, habits, transformations, food-plants, enemies of and means against the same; descriptions and figures of larva and imago; figure of pupa; hibernation and the effects of climate on the prolongation of the life of insects.

1130. RILEY, C. V. Insects injurious to the grape-vine. No. 6. <Amer. Ent., March, 1870, v. 2, pp. 150-153, figs. 100-102. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 80-82, fig. 55.

Treats of Alypia octomaculata; see No. 1127 for synopsis of contents.

- 1131. [RILEY, C. V.] Pithy blackberry gall. <Amer. Ent., March, 1870, v. 2, pp. 159-160, fig. 103.
  - Answer to inquiry of C. W. ["S. C."] Spaulding; descriptions and figures of larva and gall of Diastrophus nebulosus; figure of pupa; seasons, foodplant, guest-fly [Periclistus sylvestris], and parasite [Eurytoma diastrophi] and means against this species; the genus Diastrophus confined to Rosaceæ, Cynips to Cupuliferæ and Antistrophus to Compositæ.
- 1132. [RILEY, C. V.] Clover-worms. <Amer. Ent., March, 1870, v. 2, p. 160.
  - Answer to inquiry of G. Pauls; geographical distribution, food-habits, vernacular names and synonymy of and means against Asopia costalis.
- 1133. [RILEY, C. V.] Seed-ticks under bark of apple-trees. < Amer. Ent., March, 1870, v. 2, p. 160.
  - Answer to inquiry of O. B. Galusha; character of insects as regards the number of legs; occurrence of *Ixodes unipunctata* under outer bark of apple-trees at Morris, Ill.
- 1134. [RILEY, C. V.] Parasitic cocoons. <Amer. Ent., March, 1870, v. 2, p. 160.
  - Answer to inquiry of S. W. Beckworth; occurrence of a mass of cocoons of [Microplitis ceratomiæ var. actuosus] under red-oak at South Pass, Ill.
- 1135. [RILEY, C. V.] Is any knowledge useless? <Amer. Ent. and Bot., April, 1870, v. 2, pp. 164-166.
  - keprint of article from Manufacturer and Builder, November, 1869; minute investigations in science may be of great practical importance; cases in which a knowledge of life-history of Galeruca calmariensis [=xanthomelæna], Conotrachelus nenuphar, and Lymexylon navale was or might have been of great value.
- 1136. [RILEY, C. V.] Tomato fruit-worm. <Amer. Ent. and Bot., April, 1870, v. 2, p. 172.
  - Notice of statement by J. J. Weir that *Heliothis armigera* was bred from larvæ which fed on the fruit of tomato in England; food-plants of this insect.
- 1137. RILEY, C. V. Insects injurious to the grape-vine. No. 7. < Amer. Ent. and Bot., April, 1870, v. 2, pp. 173–174, figs. 107–108. Reprinted, with slight changes, from <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 85–87, figs. 58–59.
  - Treats of Procris [=Harrisina] americana; see No. 1127 for synopsis of contents.
- 1138. [RILEY, C. V.] The death web of young trout. <Amer. Ent. and Bot., April, 1870, v. 2, p. 174.
  - Reprint, with review, of Seth Green's "An enemy to young trout;" young trout and young white-fish killed by the web of an unknown aquatic larva, probably one of the caddis-flies; habits of the larvæ of *Phryganeidæ*. See No. 1160.
- 1139. [RILEY, C. V.] "Scab" in apple v. apple-tree plant-lice. <Amer. Ent. and Bot., April, 1870, v. 2, p. 178.
  - Notes the freedom of apple-trees in 1870 from the eggs of Aphis mali, and the opportunity to test the question of the connection of these insects with the "scab."

- 1140. [RILEY, C. V.] Insects named. <Amer. Ent. and Bot., April, 1870, v. 2, p. 179.
  - Answer to inquiry of M. Hobart; identification of several insects; foodplants of Grapta comma, Geometra [= Zerene] catenaria, Serica vespertina, and Tetraopes 5-maculatus; geographical distribution of Grapta comma; description of larva of Ecpantheria scribonia.
- 1141. [RILEY, C. V.] Supposed trout enemy. <Amer. Ent. and Bot., April, 1870, v. 2, pp. 179–180.
  - Answer to inquiry of F. Mather; identification of several insects; habits and occurrence of *Capnia minima*; occurrence of *Piophila casci* and *Ptinus brunneus* at Honeoye Falls, N. Y.
- 1142. [RILEY, C. V.] Food for trout. < Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
  - Answer to inquiry of Seth Green and Collins; with knowledge of the character of the worms which forms a desirable food for young trout, it may be possible to suggest some method of propagating the worms artificially.
- 1143. [RILEY, C. V.] Hair-snakes. < Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
  - Answer to inquiry of E. W. M.; parasitic habits, abodes and prolificacy, and classificatory relations of *Gordius varius* and *G. aquaticus*.
- 1144. [RILEY, C. V.] Egg-sack of some unknown spider. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
  - Answer to inquiry of A. Engelmann; figure of egg-sack of *Epeira* sp.?
- 1145. [RILEY, C. V.] Do worker bees sting the drones to death? <a href="#"><Amer. Ent. and Bot., April, 1870, v. 2, p. 180.</a>
  - Answer to inquiry of M. W. V.; there is no good reason to doubt that worker bees sting the drones to death when the mission of the latter is ended.
- 1146. [RILEY, C. V.] Red spider. < Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
  - Answer to inquiry of R. H. Warder; Trombidium [= Tetranychus] telarius imported from Europe; size, color, and abodes of and means against the same.
- 1147. [RILEY, C. V.] Insect named. Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
  - Answer to inquiry of M. Barrett; food-habits of Psocus venosus and other Psocidæ.
- 1148. [RILEY, C. V.] To destroy plant-lice. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
  - Answer to inquiry of B. F. Lazear; means against Aphidide on house plants.
- 1149. [RILEY, C. V.] Raspberry root-gall. <Amer. Ent. and Bot., April, 1870, v. 2, p. 181, fig. 110.
  - Answer to inquiry of K. Parsons; description and figure of gall of *Rhodites* radicum occurring on roots of Rosacca; genera of parasites raised from it; interest of the question of the manner and extent of parasitization of this gall.
- 1150. [RILEY, C. V.] Spined slug-worm. <Amer. Ent. and Bot., April, 1870, v. 2, p. 181.
  - Answer to inquiry of L. G. Saffer and A. R. Bodley; brief description of the larva of Limacodes sp.

- 1151. [RILEY, C. V.] Apple-tree insects. < Amer. Ent. and Bot., April, 1870, v. 2, p. 181.
  - Answer to inquiry of L. Camfield; identification of specimens and directions for the destruction of Orgyia leucostigma and Phycita nebulo [=Acrobasis indiginella].
- 1152. [RILEY, C. V.] Native apple-tree bark-lice. <Amer. Ent. and Bot., April, 1870, v. 2, p. 181, fig. 111.
  - Answer to inquiry of A. C. Hammond; food-plants of and means against Diaspis harrisii [= Chionaspis furfurus]; figure of infested twig of apple; the presence of enemies and parasites prevent this species becoming a formidable pest.
- 1153. [RILEY, C. V.] The hedge-hog caterpillar. <Amer. Ent. and Bot., April, 1870, v. 2, p. 182, fig. 112.
  - Answer to inquiry of H. Burt; descriptions and figures of larva and imago of Arctia [= Pyrrharctia] isabella; figure of pupa and cocoon; habits and hibernation; its larva and that of Ecpantheria scribonia called "feverworm," and ignorantly supposed to cause malarial fevers; food-habits of Horinus [= Merinus] lavis.
- 1154. [RILEY, C. V.] Chick-weed Geometer. < Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
  - Answer to inquiry of J. Huggius; identification of specimens; reference to account of *Hæmatopis grataria*; *Cermatia forceps* common in honses in the latitude of St. Louis, Mo.; the sulphur remedy for canker-worms absurd.
- 1155. [RILEY, C. V.] Bean-weevil. < Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
  - Answer to inquiry of G. W. Copley; specimens identified; occurrence and ravages of *Bruchus obsoletus* in Illinois.
- 1156. [RILEY, C. V.] Bag-worm at South Pass, Ill. < Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
  - Answer to inquiry of G. H. Baker; occurrence of Thyridopteryx ephemeræformis at South Pass, Ill.; importance of its destruction.
  - 1157. [RILEY, C. V.] Eggs of oblong-winged katy-did. <Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
    - Answer to inquiry of E. D. Ladd; differences between the cggs of *Phylloptera* [= Amblycorypha] oblongifolia and those of *Platyphyllum* [= Cyrtophyllus] concavus; the former occur on current and various trees.
  - 1158. [RILEY, C. V.] Insects injurious to the grape-vine. No. 8. <Amer. Ent. and Bot., May, 1870, v. 2, pp. 208-209, fig. 127. Reprint, with slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 61-63, fig. 24.
    - Treats of Desmia maculalis; see No. 1301 for synopsis of contents.
  - 1159. [RILEY, C. V.] The periodical Cicada alias the 17-year and 13-year locust. <Amer. Ent. and Bot., May, 1870, p. 211.
    - Quotes, from the 1st Ann. Rept. State Ent. Mo., the localities in which Cicada [= Tibiccn] septendecim and C. [= T.] tredecim will appear in 1870, with request for reports of the occurrence of these insects.
  - 1160. [RILEY, C. V.] The death-web of young trout. < Amer. Ent. and Bot., May, 1870, v. 2, p. 211.
    - Supplementary to No. 1138; the larvæ mentioned belong to the genus Simulium.

- 1161. [RILEY, C. V.] Worms under mulch hay. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212.
  - Answer to inquiry of J. F. Flagg; description, season, habits, and ravages of and means against the larvæ of *Tipula* sp.
- 1162. [RILEY, C. V.] A new pear-tree insect. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212, fig. 129.
  - Answer to inquiry of E. J. Ayres; food-habits and ravages of and means against *Platycerus quercus*; figure of imago.
- 1163. [RILEY, C. V.] Apple-twig borer. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212.
  - Answer to inquiry of J. B. Myers; Bostrichus [= Amphicerus] bicaudatus bores into the axil of limbs of pear-trees.
- 1164. [RILEY, C. V.] Cocoons of polyphemus moth. <Amer. Ent. and Bot., May, 1870, v. 2, 212.
  - Answer to inquiry of H. J. Dunlap; cocoon of Attacus [= Telea] polyphemus found on Morello cherry-tree.
- 1165. [RILEY, C. V.] Galls on supposed dock. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212.
  - Answer to inquiry of S. V. Snmmers; Gelechia gallæ-solidaginis forms galls on stems of Solidago; Gastrophysa [= Gastroidea] cyanea breeds on Rumex.
- 1166. [RILEY, C. V.] Mossy rose-gall. <Amer. Ent. and Bot., May, 1870, v. 2, p. 213, fig. 130.
  - Answer to inquiry of W. M. Locke; description of gall, larva, and image of *Rhodites rosæ*; figure of the gall; description of a parasitic larva.
- 1167. [RILEY, C. V.] Punctures on the rose-twig. <Amer. Ent. and Bot., May, 1870, v. 2, p. 213, fig. 131.
  - Answer to inquiry of G. W. Copley; punctures in rose-stem; eggs, probably of a cricket, imbedded in pith of the same; description of the egg and figure of injured stem.
- 1168. [RILEY, C. V.] Snout-beetle. < Amer. Ent. and Bot., May, 1870, v. 2, p. 213.
  - Answer to inquiry of Mary Treat; Hylobius confusus a timber borer and usnally in pine.
- 1169. [RILEY, C. V.] The oyster-shell bark-louse in Missouri. < Amer. Ent. and Bot., May, 1870, v. 2, pp. 213-214, fig. 132.
  - Answer to inquiry of B. P. Hanan; occurrence of Aspidiotus conchiformis [=Mytilaspis pomorum] in Missouri; importance of the thorough extirpation of the insect; figure of a piece of bark infested by the same.
- 1170. [RILEY, C. V.] The pod-like willow-gall. <Amer. Ent. and Bot., May, 1870, v. 2, p. 214, fig. 133.
  - Answer to inquiry of J. R. Muhleman; description and figure of the gall of *Cecidomyia salicis-siliqua*; figure of larva; food-plants, synonymy, and description of the pupa of the same.
- 1171. [RILEY, C. V.] Bee-nest. <Amer. Ent. and Bot., 1870, v. 2; May, p. 214, fig. 134; September, p. 307.
  - Answer to inquiry of J. R. Muhleman; description and figure of larva of *Prosopis affinis* in hot, low currant-stem; probability that *Ceratina dupla* breeds twice a year.

- 1172. [RILEY, C. V.] Beetles named. < Amer. Ent. and Bot., May, 1870, v. 2, p. 214.
  - Answer to inquiry of S. V. Summers; specimens identified; difference between Canthon lavis and C. chalcites.
- 1173. [RILEY, C. V.] Great discovery: Curculio extermination possible! <Amer. Ent. and Bot., June, 1870, v. 2, pp. 225–227. Notice: <Cultivator and Country Gentleman, 9 June, 1870, v. 35, p. 361.
  - Reprint of articles by J. E. Chamberlain and Mrs. H. Wier on the destruction of the Curculio; letter from W. B. Ransom; criticism of the same; means against Conotrachelus nenuphar; distinctions between C. nenuphar and Anthonomus quadrigibbus.
- 1174. [RILEY, C. V.] The death-web of young trout. <Amer. Ent. and Bot., June, 1870, v. 2, pp. 227–228, figs. 143–144.
  - Value and progress of fish-culture; habits of Simulium piscicidium, with the observations of Seth Green and Sara J. McBride; figures larva and pupa of S. piscicidium and the imago of S. molestum.
- 1175. [RILEY, C. V.] Insects injurious to the grape-vine. No. 9. < Amer. Ent. and Bot., June, 1870, v. 2, pp. 234–235, fig. 148. Reprint, with slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 65–68, fig. 27.
  - Treats of Pterophorus [= Oxyptilus] periscelidactylus; see No. 1301 for synopsis of contents.
- 1176. [RILEY, C. V.] The apple Curculio. <Amer. Ent. and Bot., June, 1870, v. 2, p. 243, fig. 152. Figures of the image of Anthonomus quadrigibbus.
- 1177. [RILEY, C. V.] The new Curculio remedy. <Amer. Ent. and Bot., June, 1870, v. 2, p. 243.
  - Results of experiments in the use of Ransom ehip-trap for Conotrachelus nenuphar.
- 1178. [RILEY, C. V.] Tarantula of Texas. < Amer. Ent. and Bot., June, 1870, v. 2, p. 244.
  - Answer to inquiry of L. J. Stroop; the figure of Mygale hentzii given in volume one is somewhat incorrect.
- 1179. [RILEY, C. V.] Ailanthus silk-worm naturalized. <Amer. Ent. and Bot., June, 1870, v. 2, p. 244.
  - Answer to inquiry of A. S. Fuller; introduction and naturalization of Attacus cynthia.
- 1180. [RILEY, C. V.] Cypress-gall. <Amer. Ent. and Bot., June, 1870, v. 2, p. 244, fig. 153.
  - Answer to inquiry of J. P. Stelle; description and figures of gall and description of gall and image of *Cecidomyia cupressi-ananassa* n. sp. on cypress; figures breast-bone of the larva.
- 1181. [RILEY, C. V.] Tent-caterpillar of the forest. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
  - Answer to the inquiries of A. M. Brown and J. H. Evans; habits, food-plants, and ravages of Clisiocampa sylvatica [=disstria] and C. americana.

- 1182. [RILEY, C. V.] Worm-boring into peach. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
  - Answer to inquiries of W. C. Flagg, A. C. Hammond, and M. M. Hooton; food-plants and description of larva of Xylina cinerca [=Lithophanc antennata].
- 1183. [RILEY, C. V.] Insects named. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
  - Answer to inquiry of A. Engelman; descriptions of Smilia auriculata and Membracis ampelopsidis; both species common on grape-vines.
- 1184. [RILEY, C. V.] Lice on "snow-balls. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
  - Answer to inquiry of Mrs. C. L. Seymour; means against Aphidida.
- 1185. [RILEY, C. V.] Twig-borer. < Amer. Ent. and Bot., June, 1870, v. 2 p. 245, fig. 154.
  - Answer to inquiries of S. H. Kriedelbaugh and G. F. Merriam; figures of male and female *Bostrichus* [=Amphicerus] bicaudatus, which bore into the axils of grape-buds.
- 1186. [RILEY, C. V.] Bee enemy. < Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
  - Answer to inquiry of F. Brewer; Staphylinus maculosus, found eating a bee, is rather a scavenger than an insect of prey.
- 1187. [RILEY, C. V.] Knots on apple-tree roots caused by root-lice. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
  - Answer to inquiry of B. N. McKinstry; ravages of and means against Schizoneura lanigera on roots of young apple-trees.
- 1188. [RILEY, C. V.] Beetles named. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
  - Answer to inquiry of W. W. Daniells; Ithycerus noveborucensis injures appleleaves.
- 1189. [RILEY, C. V.] Bag-worm. < Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
  - Answer to inquiry of M. M. Hooten; occurrence of young larva of *Thyridopteryx ephemeraformis* on peach-trees; manner in which they carry their cases.
- 1190. [RILEY, C. V.] The larder-beetle. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
  - Answer to inquiry of S. H. Kriedclbaugh; food-habits and description of the larva and image of *Dermestes lardarius*.
- 1191. [RILEY, C. V.] Water-bug. <a href="https://www.and.nc.nd.nd...">Amer. Ent. and Bot., June, 1870, v. 2, p. 246.</a>
  - Answer to inquiry of W. H. Harrington; habits and description of Ranatra fusca.
- 1192. [RILEY, C. V.] Gregarious worms on horse-chestnut. < Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
  - Answer to inquiry of W. R. Howard; oviposition, food-plant, and parasite of *Tortrix* [= Cacoecia] rileyana.
- 1193. [RILEY, C. V.] Pupa of the disippus butterfly. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246, fig. 155.
  - Answer to inquiry of T. Montgomery; figure and colors of pupa of Limenitis disippus; food-plants and hibernations of larva.

- 1194. [RILEY, C. V.] Prickly-rose gall. < Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
  - Answer to inquiry of J. Cochrane and J. P. Stelle; brief description of the gall of *Rhodites bicolor* on wild rose.
- 1195. [Riley, C. V.] Insects feeding on sap of black-walnut. < Amer. Ent. and Bot., June, 1870, v. 2, p. 246.

  Answer to inquiry of M. Barrett; food-habits of *Psocus venosus*.
- 1196. [RILEY, C. V.] Locust-borer. < Amer. Ent. and Bot., June, 1870, v. 2, p. 246.

Answer to inquiry of "Arbor;" means against Arhopalus [= Cyllene] robinia.

- 1197. [RILEY, C. V.] To exterminate cockroaches. < Amer. Ent. and Bot., June, 1870, v. 2, p. 246.

  Answer to inquiry of R. F. Weitbree; means against cockroaches.
- 1198. [RILEY, C. V.] The white-lined morning Sphinx. (Deilephila lineata, Fabr.) < Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 257-258, figs. 162-164. Reprint, with additions and slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 140-142, figs. 60-62.

Treats of Deilephila lineata; see No. 1301 for synopsis of contents.

- 1199. [RILEY, C. V.] Descriptive entomology. <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 258–261. Abstract: <Cultivator and Country Gentleman, 6 April, 1871, v. 36, p. 218.
  - Critical review of a remark by J. A. Lintner; calculation of the cost, labor, and extent of a work containing the description and figure of every existing species of insect.
- 1200. [RILEY, C. V.] The tent-caterpillar of the forest. (Clisiocampa sylvatica, Harr.) < Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 261–266, figs. 165–168. Reprint, with additions and slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 121–129, figs. 52–54.

Treats of Clisiocampa sylvatica [= disstria]; see No. 1301 for synopsis of contents.

- 1201. [RILEY, C. V.] The Ransom Curculio remedy. <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 268-271.
  - Discussion of the efficacy of the Ransom chip-trap against *Conotrachelus* nenuphar; extracts from and criticism of articles by E. S. Hull, W. B. Ransom, and others on this subject.
- 1202. [RILEY, C. V.] Insects injurious to the grape-vine. No. 10. <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 272-273, fig. 170. Reprint, with additions and slight changes. <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 68-69, fig. 28. Treats of Spilosoma virginica; see No. 1301 for synopsis of contents.
- 1203. [RILEY, C. V.] The Walsh entomological cabinet. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.

Remarks on the purchase and disposal of the entomological collection of B. D. Walsh.

- 1204. [RILEY, C. V.] The current-worm! < Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
  - Comments upon the confusing way in which some horticultural publications treat of the currant-worm, without discrimination of species.
- 1205. [RILEY, C. V.] Water larva. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.

  Answer to inquiry of F. Mather; habits of the larvæ of Ephemeridæ.
- 1206. [RILEY, C. V.] Large black potato-beetles. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
  - Answer to inquiry of R. S. Elliott; *Epicauta corvina?* injuring potato-vines in Kansas.
- 1207. [RILEY, C. V.] Destroying cherry plant-lice. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.

  Answer to inquiry of G. C. Brackett; means against Myzus cerasi.
- 1208. [RILEY, C. V.] Caterpillars on grape-vines. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
  - Answer to inquiry of G. A. Watson; larvæ of Alypia octomaculata and Acronycta oblinita found on grape-vines; food-plants of the latter species.
- 1209. [RILEY, C. V.] Ash-gray blister-beetle. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
  - Answer to inquiry of P. H. Foster; Lytta cinerea [= Macrobasis unicolor] feeding on the three-thorned Acacia.
- 1210. [RILEY, C. V.] Specimens lost. <Amer. Ent. and Bot., July- August, 1870; v. 2, p. 276.
  - Answer to inquiry of C. H. Roberts; food-habits and description of larva of Gortyna nitela and of an undetermined moth on peach-trees.
- 1211. [RILEY, C. V.] White willow worm. < Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
  - Answer to inquiry of S. H. K.; food-plants and description of larva of and means against *Nematus ventralis*.
- 1212. [RILEY, C. V.] Bark-lice on grape-vine and raspberry saw-fly. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
  - Answer to inquiry of S. Thompson; Lecanium [= Pulvinaria] vitis common on grape-vines in Europe and North America; its oviposition and occurrence in Illinois; description and means against the larva of Sclandria [= Monophadnus] rubi.
- 1213. [RILEY, C. V.] Apple-tree borer; variations in the two-striped Saperda. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
  - Answer to inquiry of D. B. Wier; colorational variations in Saperda bivittata [=candida]; abundance and ravages of Capsus oblineatus [=Lygus pratensis].
- 1214. [RILEY, C. V.] The plum Curculio breeds in apple. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
  - Answer inquiry of E. Leming; Conotrachclus nenuphar breeds in the fruit of apple.

- 1215. [RILEY, C. V.] Cecropia worm. < Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
  - Answer to inquiry of J. F. Thompson; occurrence and ravages of the larva of Attacus cecropia on apple-trees.
- 1216. [RILEY, C. V.] Gigantic rhinoceros beetle. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
  - Answer to inquiry of L. G. Saffer; variations in coloration of Dynastes tityus.
- 1217. [RILEY, C. V.] Roman-nosed pupa. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
  - Answer to inquiry of E. D. Van Winkle; food-habits of *Limenitis ursula* and L. disippus; the pupe of the two species are alike.
- 1218. [RILEY, C. V.] The onward march of the Colorado potato-beetle. A word to our Canadian neighbors. <Amer. Ent. and Bot., September, 1870, v. 2, pp. 289-291, fig. 181.
  - Remarks on the spread of *Doryphora decemlineata* into Ontario, and means of checking it; efficacy and proper use of Paris green; other remedies; *Lebia grandis* a natural enemy of the larvæ.
- 1219. [RILEY, C. V.] The tarnished plant-bug. (Capsus oblineatus, Say). <Amer. Ent. and Bot., September, 1870, v. 2, pp. 291–293, fig. 182. Reprinted, with additions and slight changes, from <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 113–115, fig. 83.
  - Treats of Capsus oblineatus [=Lygus pratensis]; see No. 1127 for synopsis of contents.
- 1220. [RILEY, C. V.] Osage orange for the mulberry silk-worm. <Amer. Ent. and Bot., September, 1870, v. 2, p. 293.
  - Reprint and critical review of S. Cornaby's article on the above; important articles should not be published anonymously.
- 1221. [RILEY, C. V.] Insects injurious to the grape-vine. No. 11. <Amer. Ent. and Bot., September, 1870, v. 2, p. 295, fig. 185. Reprint with slight changes. <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 77–79, fig. 34.
  - Treats of Pelidnota punctata; see No. 1301 for synopsis of contents.
- 1222. [RILEY, C. V.] The slug on pear and cherry trees. < Amer. Ent. and Bot., September, 1870, v. 2, p. 296.
  - Reprint and critical review of "Addi" on the above; ravages of and means against Selandria [= Eriocampa] cerasi.
- 1223. [RILEY, C. V.] Appendix to joint worm article published in vol. 1, No. 8 < Amer. Ent. and Bot., September, 1870, v. 2, pp. 296–297.
  - Introduction to and explanation of the preparation and publication of Walsh's *Enrytomides*. See No. 384.
- 1224. [RILEY, C. V.] Entomology indeed run mad! < Amer. Ent. and Bot., September, 1870, v. 2, p. 305.
  - Critical review of Mark Miller's article on the currant-worm; Nematus ventricosus [=ribesii] confounded with Eufitchia ribearia.
- 1225. [RILEY, C. V.] Red spider. < Amer. Ent. and Bot., September, 1870, v. 2, p. 305.
  - Ravages and transformations of Tetranychus telarius.

- 1226. [RILEY, C. V.] Insects named. < Amer. Ent. and Bot., September, 1870, v. 2, p. 306.
  - Answer to inquiry of J. K. Kidd; food-habits of Silpha peltata [=americana] and allied forms, of Calosoma scrutator and of Laphria [= Dasyllis] thoracica; mimicry between Laphria and Bombus and its nse.
- 1227. [RILEY, C. V.] Caterpillar of white-marked tussock moth. <Amer. Ent. and Bot., September, 1870, v. 2, p. 306, fig. 186.
  - Answer to inquiry of G. C. Brackett; figure of larva and description of imago of Orgyia leucostigma; posture of male in repose; habits of female; Saperda bivittata [= candida] usuall; perishes if it has not changed to a pnpa before the death of the tree; Chrysobothris femorata lives for weeks on dead wood.
  - 1228. [RILEY, C. V.] Does the apple Curculio go underground to transform? <Amer. Ent. and Bot., September, 1870, v. 2, p. 306.
    - Answer to inquiry of W. Muir; Anthonomus quadrigibbus transforms within the fruit; it does not attack stone fruit.
  - 1229. [RILEY, C. V.] Walnut caterpillars. <Amer. Ent. and Bot., September, 1870, v. 2, p. 306.
    - Answer to inquiry of G. M. Levette; seasons, habits, and food-plant of and means against *Datana ministra*; description of larva.
  - 1230. [RILEY, C. V.] Striped blister-beetle. <Amer. Ent. and Bot., September, 1870, v. 2, p. 306, fig. 187.
    - Answer to inquiry of A. Galt; means against Epicauta vittata and other Meloidæ on potato vines; figure of Epicauta vittata.
  - 1231. [RILEY, C. V.] Grape-vine Fidia. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307, fig. 188.
    - Answer to inquiry of J. Hetzel; habits, ravages, and food-plants of and means against Fidia viticida; figure of this species.
  - 1232. [RILEY, C. V.] Some interesting insects. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307.
    - Answer to inquiry of A. S. Fuller; ravages of Bruchus obsoletus in Lima beans; of Butalis cerealella in flint corn in stems and of Lobesia [=Eudemis] botrana in blossoms of blackberry; description of the larva case of Phycita nebulo [=Acrobasis indiginella] and of galls of Cccidomyia tubicola on Carya.
  - **1233.** [RILEY, C. V.] The green hag-moth. < Amer. Ent. and Bot., September, 1870, v. 2, p. 307.
    - Answer to inquiry of S. B. Shaw; food-plants, and synonymy of *Callochlora* viridis [==Parasa chloris]; description of larva and imago; the larva described by Reakirt does not belong to this species.
  - 1234. [RILEY, C. V.] The antiopa butterfly. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307.
    - Answer to inquiry of A. S. Moss; description of larva and image of *Vanessa antiopa*; the larva feeds on willow; vernacular name and comparative abundance.
  - 1235. [RILEY, C. V.] Rose-gall and pupa of archippus butterfly. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307, fig. 189.
    - Answer to inquiry of L. B. Custar; figure of pupa of Danais archippus; descriptions of three undetermined galls on rose-leaf formed by Rhodites sp.?

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- 1236. [RILEY, C. V.] White grubs in strawberry beds. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307.
  - Answer to inquiry of J. B. Miller; food-habits of larva and description of imago of Cyclocephala immaculata.
- 1237. [RILEY, C. V.] Larva of the thoas swallow-tail. < Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
  - Answer to inquiry of E. H. Sprague; food-plant and description of larva of Papilio thoas [=eresphontes]; the larva rare in Missouri.
- 1238. [RILEY, C. V.] Larva of clubbed tortoise-beetle. < Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
  - Answer to inquiry of A. R. Bodley; Cassida, Coptocycla and Deloyala feed on Convolvulacew with the exception of Deloyala [=Coptocycla] clavata which feeds on Solanacew.
- 1239. [RILEY, C. V.] The banded Ips in calyx of pear. <Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
  - Answer to inquiry of G. C. Brackett; food-habits and description of *Ips fasciatus*.
- 1240. [RILEY, C. V.] The larder-beetle. <Amer. Ent. and Bot., September, 1870, v. 2, p. 308, fig. 191.
  - Answer to inquiry of F. S. Sleeper; figures of larva and image and of magnified hair of larva of *Dermestes lardarius*; ravages in collections of preserved animals.
- 1241. [RILEY, C. V.] Moth named. < Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
  - Answer to inquiry of E. M. Hale; description of Ctenucha latreillana [=vir-ginica]; its abundance in 1870 in the vicinity of St. Louis, Mo.
- 1242. [RILEY, C. V.] The little Cicada. <Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
  - Answer to inquiry of G. O. Hardeman; occurrence of *Cicada* [=*Melampsalta*] parvula in Missouri.
- 1243. [RILEY, C. V.] The brown mantispian. <Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
  - Answer to inquiry of G. C. Bracket; Mantispa brunnea common, predaceous, and beneficial.
- 1244. [RILEY, C. V.] Small reddish snout-beetle on apple. <Amer. Ent. and Bot., September, 1870, v. 2, p. 30.
  - Answer to inquiry of J. Weed; food-habits and description of Anthonomus cratægi.
- 1245. [RILEY, C. V.] Prickly rose-gall. < Amer. Ent. and Bot., September, 1870, v. 2, p. 309, fig. 192.
  - Answer to inquiry of "Subscriber;" description and figure of galls and description of Rhodites bicolor.
- 1246. [RILEY, C. V.] Questions answered. <Amer. Ent. and Bot., September, 1870, v. 2, p. 309.
  - Answer to inquiries of K. Parsons; formation and use of portable cases by *Tineina*; habits and character of the young of *Mytilaspis pomicorticis* [=pomorum]; food-habits of ants.

- 1247. [RILEY, C. V.] Hog-caterpillar of the vine infested with parasites. <a href="#"><Amer. Ent. and Bot.</a>, September, 1870, v. 2, p. 309.
  - Answer to inquiry of J. M. Wilson; occurrence of larva of Darapsa [=Am-pelophaga] myron parasitized by Apanteles congregatus.
- 1248. [RILEY, C. V.] Larva of Abbot Sphinx. < Amer. Ent. and Bot., September, 1870, v. 2, p. 309.
  - Answer to inquiry of S. E. Todd; occurrence of larva of *Thyreus abbotii* on grape-vine; means against the same.
- 1249. [RILEY, C., V.] Cecropia worm. < Amer. Ent. and Bot., September, 1870, v. 2, p. 309.
  - Answer to inquiry of E. G. Hofman; occurrence of Attacus cecropia on plum.
- 1250. [RILEY, C. V.] Flat-headed borer in soft maples. <Amer. Ent. and Bot., September, 1870, v. 2, p. 309.
  - Answer to inquiry of L. R. Elliott; ravages of and means against Chryso-bothris femorata on soft maple; ravages of Arhopalus [= Cyllene] robinia on black-locust.
- 1251. [RILEY, C. V.] Cherry plant-lice and their foes. <Amer. Ent. and Bot., September, 1870, v. 2, p. 309, fig. 193.
  - Answer to inquiry of C. H. Roberts; occurrence on cherry-trees of Aphis [= Myzus] cerasi, and of its enemies, the larva of Hippodamia convergens and Syrphus sp.; figure of the larva, pupa, and image of the former; positions in which both species transform.
- 1252. [RILEY, C. V.] Grape-vine flea-beetle. < Amer. Ent. and Bot., September, 1870, v. 2, p. 309.
  - Answer to inquiry of C. H. Roberts; ravages of *Haltica chalybea*; means against this species and *Sclandria vitis* [= Blennocampa pygmwa] on grapevines.
- 1253. [RILEY, C. V.] Blood-sucker and pear-slug. <Amer. Ent. and Bot., September, 1870, v. 2, p. 309.
  - Answer to inquiry of G. A. Watson; food-habits of *Pirates* [= *Melanolestes*] picipes and of Hemiptera in general; means against *Sclandria* [= *Eriocampa*] cerasi.
- 1254. [RILEY, C. V.] The codling-moth. (Carpocapsa pomonella, Linnaeus.) < Amer. Ent. and Bot., October, 1870, v. 2, pp. 321–322. Reprint: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 101–104.
  - Treats of Carpocausa pomonella; see No 1301 for synopsis of contents.
- 1255. [RILEY, C. V.] Insects injurious to the grape-vine. No. 12. <Amer. Ent. and Bot., October, 1870, v. 2, pp. 327–328, figs. 1 204–205. Reprint, with slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 79–81, figs. 35, 36; Cultivator and Country Gentleman, 1 June, 1871, v. 36, p. 343.
  - Treats of Graptodera [= Haltica] chalybea; see No. 1301 for synopsis of contents.
- 1256. [RILEY, C. V.] The fall army-worm. <Amer. Eut. and Bot., October, 1870, v. 2, pp. 328–329, figs. 206–207.
  - Seasons, food-plants, and ravages of Laphygma frugiperda; figures larvæ of Leucania unipuncta and Laphygma frugiperda; comparison between the latter and Heliothis armigera.

- 1257. [RILEY, C. V.] The rape butterfly; our new cabbage pest. <Amer. Ent. and Bot., October, 1870, v. 2, p. 338.

  Spread of and means against *Pieris rape*.
- 1258. [RILEY, C. V.] Paris-green for the Curculio. <Amer. Ent. and Bot., October, 1870, v. 2, p. 338.

  Inefficacy of the use of Paris-green against Conotrachelus nenuphar.
- 1259. [RILEY, C. V.] Beetles working in wheat, oats, and rye; the grain Silvanus. <Amer. Ent. and Bot., October, 1870, v. 2, p. 339, fig. 208.
  - Answer to inquiry of M. H. Boye; figure, description, and ravages of Silvanus surinamensis; means against the same and against Calandra granaria in grain; habitat and probable origin of the Silvanus.
- 1260. [RILEY, C. V.] Beetles in dried English currants. < Amer. Ent. and Bot., October, 1870, v. 2, p. 339.
  - Answer to inquiry of T. V. Munson; Silvanus surinamensis breeding abundantly in dried English currants.
- 1261. [RILEY, C. V.] The same in flouring-mills. <Amer. Ent. and Bot., October, 1870, v. 2, p. 339.

  Answer to inquiry of S. Blanchard; abundance of Silvanus surinamensis in
  - Answer to inquiry of S. Blanchard; abundance of Silvanus surinamensis in flouring-mills.
- 1262. [RILEY, C. V.] Carolina Sphinx. < Amer. Ent. and Bot., October, 1870, v. 2, p. 339.

  Answer to inquiry of W. R. Howard; the larva of Macrosila [= Protoparce]

carolina feeds on tobacco.

- 1263. [RILEY, C. V.] Insects clustered on apple-trees. <Amer. Ent. and Bot., October, 1870, v. 2, p. 339.

  Answer to inquiry of R. L. Ham; habits and food of *Psocus venosus*.
- 1264. [RILEY, U. V.] Larvæ named. < Amer. Ent. and Bot., October, 1870, v. 2, p. 339.
  - Answer to inquiry of T. W. Gordon; stinging powers of the larvæ of *Empretia stimulea* and *Hyperchiria varia* [=io]; *Microgaster* sp. parasitic upon *Macrosila quinquemaculata* [= *Protoparce celeus*].
- 1265. [RILEY, C.V.] Mite-gall on sugar-maple. <Amer. Ent. and Bot., October, 1870, v. 2, p. 339.
  - Answer to inquiry of A. Furnas; description of gall of Acarus aceris-crumcna n. sp. on leaves of sugar-maple; similar mite-galls occur on plum and cherry.
- 1266. [RILEY, C. V.] Cheese-fly and blow-fly. <Amer. Ent. and Bot., October, 1870, v. 2, p. 339.
  - Answer to inquiry of B.; skippers in cheese are larvæ of *Piophila casei*; those found in bacon of *Calliphora vomitoria*.
- 1267. [RILEY, C. V.] Fall army-worm. < Amer. Ent. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiries of K. Kelsey and G. Pauls; seasons, ravages, and foodplants of *Laphygma frugiperda*; seasons and food-plants of *Leucania unipuncta*.

- 1268. [RILEY, C. V.] Larva of imperial moth; Thoas swallow-tail. <Amer. Ent. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiry of G. M. Dodge; larva of Ceratocampa [= Eacles] imperialis feeds on maple.
- 1269. [RILEY, C. V.] Large Asilus fly. < Amer. Ent. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiry of L. G. Saffer; food-habits of Promachus vertebratus, P. [= Erax] bastardii, and 'Asilus missouriensis [= Proctacanthus milbertii]; oeenrenee of undetermined galls under white-oak trees.
- 1270. [RILEY, C. V.] Mole cricket. <Amer. Ent. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiry of V. K. Deyo; habits of Gryllotalpa boreatis.
- 1271. [RILEY, C. V.] A rare capture in Illinois. <Amer. Eut. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiry of H. S. Bontell; geographical distribution of Callidryas philea; occurrence of Thysania zenobia in Iowa.
- 1272. [RILEY, C. V.] Hag-moth larva. <Amer. Ent. and Bot., October, 1870, v. 2, p. 340, fig. 209.
  - Answer to inquiries of D. M. Hunter and G. Pauls; figure of larva and description of imago of Limacodes [= Phobetrum] pitheeium; larva found on apple-tree; formation of its eoeoon.
- 1273. [RILEY, C. V.] Insects named. < Amer. Ent. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiry of Mrs. E. U. B.; larva of *Papilio asterias* feeds on parsnip; that of *Alaria* [= Rhodophora] florida on evening primrose; habits of the image of the latter.
- 1274. [RILEY, C. V.] Some friends and foes. < Amer. Ent. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiry of C. W. Spaulding; food-habits of Harpactor [= Milyas] cinetus, Mysia [=Anatis] 15-punctata, and Calosoma calidum; Prionus imbricornis bred from grape-vine roots.
- 1275. [RILEY, C. V.] The royal-horned caterpillar. <Amer. Ent. and Bot., October, 1870, v. 2, p. 340.
  - Answer to inquiry of J. T. Hodgen; larva of Ceratocampa [=Citheronia] regalis found on persimmon.
- 1276. [RILEY, C. V.] Caterpillars named. <Amer. Ent. and Bot., October, 1870, v. 2, p. 341, fig. 210.
  - Answer to inquiry of E. H. King; food-plants and descriptions of larvæ of *Papilio asterias* and of *Aeronycta obtinita*; function of the osmaterium of the former; vernaeular name and figure of larva, coeoon, and imago of the latter.
- 1277. [Riley, C. V.] The Abbot Sphinx; parasites on its larva. <Amer. Ent. and Bot., October, 1870, v. 2, p. 341.
  - Answer to inquiry of T. W. Gordon; description of Thyreus abbotii; life-history of Microgaster sp. parasitic on larva of Sphingida.
- 1278. [RILEY, C. V.] Crane-flies; rose-bugs; ants. < Amer. Ent. and Bot., October, 1870, v. 2, p. 341.
  - Answer to inquiry of J. W. Potts; food-habits of Tipula sp. and of Macrodactylus subspinosus; structure and habits of the several sexes of Formicidæ.

- 1279. [RILEY, C. V.] Cabbage-worms. < Amer. Ent. and Bot., October, 1870, v. 2, p. 341.
  - Answer to inquiry of B. H. Foster; ravages of and means against Pieris rapæ.
- 1280. [RILEY, C. V.] The unicorn prominent. <Amer. Ent. and Bot., October, 1870, v. 2, p. 341.
  - Answer to inquiry of E. Payne; description of larva and image of *Notodonta* [= Cwlodasys] unicornis; food-plants and mimicry of the larva.
- 1281. [RILEY, C. V.] Insects injurious to the grape-vine. No. 13. <Amer. Ent. and Bot., December, 1870, v. 2, pp. 353-359, figs. 218-219. Reprint with changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 84-96, figs. 37-40. See: <Bull. de la Soc. Cent. d'Agric., 1870.
  - Treats of Phylloxera vastatrix; see No. 1301 for synopsis of eontents.
- 1282. [RILEY, C. V.] The fall army-worm. <Amer. Ent. and Bot., December, 1870, v. 2, pp. 363-365, figs. 221-223.
  - Descriptions of egg, larva, pupa, and imago of *Prodenia autumnalis* n. sp. [=Laphygma frugiperda]; variation of the imagos; seasons, habits, and ravages of and means against the same; figures of larva and imago of *Prodenia commelinæ* and of imago of *Leucania unipuncta*.
- 1283. [RILEY, C. V.] The so-called web-worm of young trout. < Amer. Ent. and Bot., December, 1870, v. 2, pp. 366-367.
  - Editorial remarks appended to S. J. McBride's communication; description of Simulium piscicidium n. sp.
- 1284. [RILEY, C. V.] Hybrid between a grape-vine and a hickory. <a href="#"><Amer. Ent. and Bot.</a>, December, 1870, v. 2, p. 373.
  - Correction of error in mistaking a gall of Cecidomyia vitis-pomum for a hybrid fruit.
- 1285. [RILEY, C. V.] Death of noted entomologists. < Amer. Ent. and Bot., December, 1870, v. 2, p. 373.

  Notice of death of Julius Lederer and J. T. Laeordaire.
- 1286. [RILEY, C. V.] Osage orange for the mulberry silk-worm. <Amer. Ent. and Bot., December, 1870, v. 2, p. 373.
  - Explanation of diff renees in experience in feeding silk-worms on osage orange.
- 1287. [RILEY, C. V.] Insects named. < Amer. Ent. and Bot., December, 1870, v. 2, p. 373.
  - Answer to inquiry of Mrs. M. Chappellsmith; Astoma [= Trombidium] locustarum parasitic on grasshoppers; similar mites on other insects; food-habits of Nemobius vittatus and Orocharis saltator.
- 1288. [RILEY, C. V.] Locust-borer. < Amer. Ent. and Bot., December, 1870, v. 2, p. 373.
  - Answer to inquiry of W. R. Howard; seasons and method of oviposition of Arhopalus [= Cyllens] robiniæ in black-locust; description of eggs and imago of the same.
- 1289. [RILEY, C. V.] The northern lady-bird; its larvæ. <Amer. Ent. and Bot., December, 1870, v. 2, p. 373.
  - Answer to inquiry of C. E. Billings; food-habits and description of larva of Epilachna borealis.

- 1290. [RILEY, C. V.] Not eggs, but parasitic cocoons. <Amer. Ent. and Bot., December, 1870, v. 2, p. 373.
  - Answer to inquiry of R. Couch; occurrence and true nature of cocoons of *Microgaster* sp. on larva of *Darapsa* [= Ampelophaga] myron.
- 1291. [RILEY, C. V.] The cabbage Plutella. <Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of C. E. Bessey; ravages of Plutella cruciferarum on cabbages.
- 1292. [RILEY, C. V.] Gigantic rhinoceros beetle. < Amer. Ent. and Bot., December, 1870, v. 2, p. 374, fig. 224.
  - Answer to inquiry of "Subscriber;" figure of male and description of the male and female of *Dynastes tityus*; distribution; food-habits of larva.
- 1293. [RILEY, C. V.] Bee-bread devoured by worms. <Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of L. C. Francis; food-habits of *Ephestia zew* [=interpunctella] and *Galleria cereana*; ravages of the former in old beehives.
- 1294. [RILEY, C. V.] Rape butterfly. < Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of J. E. Cowden; ravages of Pieris rapæ on cabbages.
- 1295. [RILEY, C. V.] Grape-leaf gall. < Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of H. C. Beardslee; occurrence of *Phylloxera vastatrix* at Painesville, Ohio.
- 1296. [RILEY, C. V.] Bean weevil. <Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of H. Kleinhaus; ravages and distribution of Bruchus obsoletus.
- 1297. [RILEY, C. V.] Cabbage insects. < Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of W. R. Howard; ravages, distribution, and synonyms of *Plutella cruciferarum*; first occurrence of *Strachia* [= *Margantia*] *histrionica* in Missouri.
- 1298. [RILEY, C. V.] Two-striped walking stick. < Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of C. R. Edwards; occurrence of Spectrum bivittatum in Kentucky.
- 1299. [RILEY, C. V.] Ladder spider. < Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of L. G. Saffer; explanation of the vernacular name of Epeira [=Argiope] riparia.
- 1300. [RILEY, C. V.] Sugaring for moths; preserving larva. < Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
  - Answer to inquiry of H. S. Boutwell; occurrence of *Papilio thoas* [=cres-phontes] in Illinois; directions for the preparation of a fluid for preserving caterpillars.

1301. RILEY, C. V. Third annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <6th Ann. Rept. State Board of Agric. for 1870, April, 1871, pp. 176+7, 73 figs. Separate: Jefferson City, Mo., April, 1871, pp. 176+7, 73 figs.

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- 1302. RILEY, C. V. Snout-beetles injurious to fruits. <Trans. Ill. Hortic. Soc. for 1870, 1871, n. s., v. 4, pp. 89-124, figs. 1-11. Reprint, with additions and omissions: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 5-44, figs. 1, 3, 4, 7-14. See No. 1301 for synopsis of contents.
- 1303. RILEY, C. V. Bark-lice on rose bushes. <Moore's Rural New Yorker, 24 June, 1871, v. 23, p. 393. S.-b. No. 4, p. 3.

  Answer to inquiry of W. A. French; occurrence of and means against Lecanium rose [= oleæ] and Diaspis rose on rose bushes.
- 1304. RILEY, C. V. Canker-worms; not army-worms. < Moore's Rural New Yorker, 24 June, 1871, v. 23, p. 393.
- 1305. RILEY, C. V. How to distinguish between *Limenitis disippus* Godt., and *L. ursula* Fabr., in their preparatory states. <Ca. Ent., July, 1871, v. 3, pp. 52–53, fig. 24.
  - Description and figures of structural characters distinguishing the larva and pupa of *Limenitis disippus* from those of *L. ursula*; see No. 1306.
- 1306. RILEY, C. V. Friendly notes. <Ca. Ent., September, 1871, v. 3, pp. 117-119.
  - Distinctive structural characters of pupe of Limenitis disippus and L. ursula; criticism of W. Couper's articles; description, food, and habits of Gelechia [=Holcocra] glandulella n. sp.; review of statements concerning the dimorphism of Grapta interrogationis.
- 1307. RILEY, C. V. Friendly criticism. < Gardener's Mo. and Hortic., November, 1871, v. 13, p. 341.
  - Inefficacy of the roller remedy for potato-beetles and grasshoppers; identifies "Melolontha philophaga" as Lachnosterna quercina [=fusea].
- 1308, RILEY, C. V. Parasites on fowls. The chicken mite. < Moore's Rural New Yorker, 16 December, 1871. S.-b. No. 5, p. 31.
  - Answer to inquiry of H. Hales; injuries to fowls caused by Dermanyssus galline? [=arium].
- 1309. RILEY, C. V. The American Entomologist. <Cultivator and Country Gentl., 21 December, 1871, v. 36, p. 809. Reprint: <Gardener's Mo. and Hortic., January, 1872, v. 14, p. 23. <Ca. Ent., January, 1872, v. 4, p. 19.
  - Announcement of the continued suspension of publication of the American Entomologist.
- 1309a. [RILEY, C. V.] (*Lxodes bovis.*) < Rept. Comm. of Agric. on the diseases of cattle. Washington, 1871, p. 118, fig. Description and figure of *Lxodes bovis* n. sp.
- 1310. RILEY, C. V. The acorn moth. *Holcocera glandulella*, n. sp. <a href="#">Ca. Ent.</a>, January, 1872, v. 4, pp. 18, 19.
  - Description of larva and imago of *Holeocera glandulella* n. sp.; habits of larva; food-plant and description of larva of *Balaninus rectus*.

1311. RILEY, C. V. Fourth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <7th Ann. Rept. State Board of Agric. for 1871, April, 1872, pp. 146+6, 66 figs. Separate: <Jefferson City, Mo., April, 1872, pp. 146+6, 66 figs. Notice: <Horticulturist, August, 1872, v. 27, p. 251. <Ent. Mo. Mag., July, 1872, v. 9, p. 47.

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<sup>\*</sup> Extract in <Sci. Amer., 25 May, 1872, v. 25, p. 351.

| 1311. | RILEY, C. V.—Continued.  |    |
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|        | April, 1872, v. 31, pp. 142-143, 1 fig.  Description and figure of Wier's apple-worm trap.   |       |
| .1313. | [RILEY, C. V.] Remarkable parasitic fungus. <sci. 1872="" 26,="" 347.="" 40],="" [v.="" amer="" and="" description="" figure="" fungus="" fusca.<="" grub,="" infesting="" lachnosterna="" larva="" may,="" n.="" of="" p.="" s.,="" td="" the="" unidentified="" v="" v.=""><td></td></sci.>  |       |
| 1314.  | RILEY, C. V. Cut-worm lion. < Colman's Rural World, 15 July 1872, fig. Sb. No. 5, p. 47. History of the larva and image of Calesoma calidum, an enemy to cut-work.   |       |
| 1315.  | RILEY, C. V. Cut-worms. < Cultivator and Country Gentler 20 June, 1872, v. 37, p. 392.  Dandelions and other weeds furnish food for young cut-worms which in the fall; land should be kept clear of weeds at that season.  | nan,  |
| 1316.  | RILEY, C. V. Flat-headed apple tree-borer in horse chest<br>Colman's Rural World, 22 June, 1872, fig. Sb. No. 5, p<br>Answer to inquiry of S. S. R.; natural history of larva and image of Che<br>bothris femorata.  | . 47. |
| 1317.  | RILEY, C. V. A new insect. < Western Planter, 29 June, 1<br>Sb. No. 5, p. 49.<br>Answer to inquiry of F. Halsinger; Nysius n. sp., very destructive to<br>tatoes.  |       |
| 1318.  | RILEY, C. V. Codling-moth; jarring down infested for a Country Gentleman, 4 July, 1872, v. 37, p. Excrement outside of the fruit indicates the exit of the worm, with a contract of the state of the sta | 422.  |

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- 1319. RILEY, C.-V. Food for silkworms. < Colman's Rural World, 13
  July, 1872. S.-b. No. 5, p. 40.
  Osage orange superior to red-mulberry.
- 1320. RILEY, C. V. The apple maggot-fly, Trypeta pomonella Walsh. <Amer. Agric., July, 1872, v. 31, pp. 263-264, 2 figs.
  - Answer to letter of J. H. Spatter; comparative descriptions and figures of larvæ, pupæ, and imagos of Trypeta pomonella and Carpocapsa pomonella; figures showing injuries of both species; distribution and means against Trypeta pomonella.
- 1321. RILEY, C. V. Worms on Dutchman's pipe. <Colman's Rural World, 3 August, 1872, fig: S.-b. No. 5, p. 136.

  Answer to inquiry of J. T. C.; life-history of Papilio philenor.
- 1322. RILEY, C. V. Apple-leaf worm. The apple-leaf skeletonizer. <a href="#"><Colman's Rural World</a>, 10 August, 1872, fig. S.-b. No. 5, p. 138.
  - Answer to inquiry of L. R. Bryant; habits and times of appearance of Pempelia hammondi.
- 1323. RILEY, C. V. Eggs in grape-canes and apple-twigs. <Amer. Agric., August, 1872, v. 31, p. 302, figs. 1-7.
  - Figures of eggs and of twigs punctured by Orocharis saltator, Œcanthus niveus, and Ceresa bubalus; figures images of the same; habits, descriptions of eggs, and images of the three species.
- 1324. RILEY, C. V. Borers in evergreens. < Gardener's Mo. and Hortic., December, 1872, v. 14, p. 373.
  - Larvæ of *Monohammus titillator* the worst enemy of the white-pine; another species of *Cerambycidæ* injurious to red-cedars; a host of bark-borers affect all kinds of evergreens.
- 1325. RILEY, C. V. Einige unserer schädlicherer Insekten. <St. Louis, Mo., 1872, p. 35, il. S. b. No. 19, pp. 174–190.
  - Causes of the decadence of viticulture in the United States; habits, ravages, specific identity, and figures of several stages of the leaf-inhabiting and root-inhabiting forms of Phylloxera vastatrix; identity of the European and American grape Phylloxera; susceptibility of the different species of grape to the attacks of the same; principal manifestations of attack; preventive and remedial measures; description and figures of Conotrachelus nenuphar; habits, ravages, parasites, enemies, and means against it; description of Ransom's trap, Hull's, Ward's, and Hooten's machines for capturing the imagos; figures of the machines. Natural history, food-plants, distribution, enemies, parasites, and means against Doryphora decemlineata; figures of all stages of the same; use of Paris green and other powders; mechanical devices for collecting the insects.
- 1326. RILEY, C. V. Harvest mites. <Amer. Nat., January, 1873, v. 7, pp. 16–19, fig. 5. Extract: <Colman's Rural World, 21 June, 1876, 2 figs. S.-b. No. 10, pp. 170, 171.
  - List of insect parasites on man; description, figures, habits of and means against Leptus = Tetranychus americanus n. sp. and L = T irritans n. sp.
- 1327. RILEY, C. V. Vanessa antiopa. <Ent. Mo. Mag., January, 1873, v. 9, p. 195.

Habits and food-plants of Vanessa antiopa.

1328. RILEY, C. V. Entomological correction. < Cultivator and Country Gentleman, 6 March, 1873, v. 38, p. 149.

Lema trilineata does not occur in sonthwesteru Missouri, as stated by W. R. Howard.

1329. RILEY, C. V. Fifth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <8th Ann. Rept. State Board of Agric. for 1872, 18 April, 1873, pp. 160+8, 75 figs. Separate: <Jefferson City, Mo., 18 April, 1873, pp. 160+8, 75 figs. Review by A. S. Packard, jr.: <Amer. Nat., August, 1873, v. 7, pp. 471-477, figs. 115-130. Reply to Packard and rejoinder by Packard: <Amer. Nat., March, 1874, v. 8, pp. 181-188.

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S.-b. No. 19, pp. 150-173.

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1330. RILEY, C. V. New York without a State entomologist. < Moore's Rural New Yorker, 5 May, 1873. S.-b. No. 8, p. 103.

Needs of a State entomologist for New York; Salix humilis infested with larva of Plectrodera scalator.

1331. RILEY, C. V. Tent-caterpillar of the forest. <N. Y. Tribune, 23 May, 1873. S.-b. No. 8, pp. 64-65.

Answer to inquiry of S. T. Gilbert; means against eggs of Clisiocampa sylvatica [= disstria].

1332. RILEY, C. V. Apple-tree borer. <N. Y. Tribune, 23 May, 1873, S. b. No. 8, p. 64.

Answer to inquiry of J. Durbin; means against Saperda bivittata [= candida].

1333. RILEY, C. V. Punctured grape-canes. <N. Y. Tribune, 23 May, 1873. S.-b. No. 8, p. 64.

Answer to inquiry of E. Snyder; food-habits and means against *Œcanthus nivcus*.

1334. RILEY, C. V. The codling moth. Weir's trap. <Amer. Agric., May, 1873, v. 32, p. 184, figs.

Unsatisfactory results of experiments with the Weir trap; relative value of materials used; criticism of J. S. Parker's theory for the extermination of Carpocapsa pomonella; this species breeds in apples, wild crabs, pears, peaches, and plums; figures females and the abdomen of the males of Pimpla annulipes and Macrocentrus delicatus parasitic upon the apple-worm.

1335. RILEY, C. V. Influence of extreme cold on the Curculio. <Gardener's Mo. and Hortic., May, 1873, v. 15, pp. 137-139.

Critical review of T. T. Southwick's article of same title; extract from 3d Ann. Rept. State Ent. Mo.

- 1336. RILEY, C. V. On a new genus in the lepidopterous family Tine-idæ, with remarks on the fertilization of Yucca. <Trans. Acad. Sci. St. Louis, June, 1873, v. 3, pp. 55-64, 2 figs. Reprinted, with omissions and slight changes, from <5th Ann. Rept. State Ent. Mo., 18 April, 1873, pp. 150-160, figs. 74-75. Review by P. C. Zeller: <Verh. k.-k. zool.-bot. Ges. Wien, 1876, Jahrg. 1875, Bd. 25, pp. 340-342. Reply to Zeller: <Trans. Acad. Sci. St. Louis, January-March, 1876, v. 3, pp. 325-326.
  - Description and figures of *Pronuba* n. g. and of larva and image of *P. yuccasella* n. sp. See No. 1329 for synopsis of contents.
- 1337. RILEY, C. V. Supplementary notes on *Pronuba yuccasella*. <Trans. Acad. Sci. St. Louis, June, 1873, v. 3, pp. 178–180, fig. 3. Extract: <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 131–135, fig. 3.
  - Descriptions and figures of male and female pupa of *Pronuba yuccasella*; hibernation, imagination, seasons, and distribution of the same; species of *Yucca* pollinated by it.
- 1338. RILEY, C. V. [To destroy the cotton-worm.] <Ill. Jour. of Agric., June, 1873. Reprint: <Colman's Rural World, 1873; <Rural Alabamian, July, 1873, v. 2, pp. 289–293; <Mobile Register, 1873; <Farmer's Advocate, 1873. Extract: <6th Ann. Rept. State Ent. Mo., 1874, pp. 17–18.
  - Ravages of Aletia argillacea [=xylina] in the eotton fields of Southern United States; inefficiency of measures hitherto employed against them; recommends the use of Paris green; directions for its use; natural history, description of egg, larva, and image of the Aletia; hibernation of the image.
- 1339. RILEY, C. V. [Imported plants and insects.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 42-43 Proc.

  Verbal communication; inequality of the exchange of plants and insects between Europe and North America; extent and causes of the same.
- 1340. RILEY C. V. [Mimicry and protective resemblances.] < Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 44-45 Proc. Verbal communication; mimicry of Danais archippus by Limenitis disippus and consequent greater abundance of the latter than of L. ursula.
- 1341. RILEY, C. V. [Silk-worms fed with osage orange.] < Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 47 Proc.

  Verbal communication; successful rearing of silk-worms on Maclura aurantiaca; exhibition of cocoons made by these worms.
- 1342. RILEY, C. V. [On the cause of deterioration in some of our native grape-vines.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 51-52 Proc.
  - Verbal communication; abstract from 4th Ann. Rept. State Ent. Mo.; failure of grape-vines attributed largely to the ravages of *Phylloxera vastatrix*.
- 1343. RILEY, C. V. [Insects affecting the ailanthus.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 53-54 Proc. Mentions Œta compta [=punctella] and Attacus cynthia.

- 1344. RILEY, C. V. [Posthumous papers by B. D. Walsh.] < Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 77 Proc.
  - Verbal communication; disposition of sundry entomological manuscripts left by B. D. Walsh.
- 1345. RILEY, C. V. [Remarks on Simulium piscicidium.] < Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 79 Proc.
  - Verbal communication; nature and supposed ravages of Simulium piscicidium.
- 1346. RILEY, C. V. [On Antherwa yama-mai as a silk-producer.] < Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 84 Proc.
  - Verbal communication; superiority of Antherwa yama-mai to other silk-worms tried as substitutes for Sericaria mori.
- 1347. RILEY, C. V. [On galls growing on wild sage.] < Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 84 Proc.
  - Verbal communication; occurrence of three distinct undescribed galls on Artemisia tridentata in Utah.
- 1348. RILEY, C. V. [On a larva of *Scenopinus* sp. from the human lungs.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 90 Proc.
  - Verbal communication; a larva of *Scenopinus* sp. found in human expectoration; usual food-habits of the larva of this genus.
- 1349. RILEY, C. V. Agricultural editorial excursion. < Prairie Farmer, 1873, v. 44: 2 August, p. 241; 9 August, p. 248; 16 August, p. 256; 23 August, p. 265; 30 August, p. 273; 6 September, p. 281. Reprint: < Colman's Rural World, 1873, 2, 9, 16, 23, and 30 August, 6 and 13 September. See: < Colorado Mountaineer, 1 August, 1877. S. b. No. 14, p. 102. Brief notes on locusts.
- 1350. RILEY, C. V. Enemies of the elm. <N. Y. Tribune, 7 August, 1873. S.-b. No. 8, pp. 56-57. Reprint: <Gardener's Mo. and Hortic., August, 1876, v. 18, p. 246.
  - Answer to inquiry of T. S. Watson; natural history of and means against Galeruca calmaricasis [= xanthomelæna].
- 1351. RILEY, C. V. Entomological information. <N. Y. Tribune, 16 August, 1873. S.-b. No. 8, p. 58.
  - Answer to inquiry of J. W.; description of a number of traps for alluring and destroying insects.
- 1352. RILEY, C. V. "Controlling sex in butterflies." <Amer. Nat., September, 1873, v. 7, pp. 513-521. Separate: <Salem, Mass., August, 1873, pp. 9.
  - Critical review of Mary Treat's article of same title; females require more nourishment than males; sex determined in the egg; oviposition of Papilio and Anisota [= Dryocampa]; larvæ can not be forced to eat more than is natural to them; experiments on Thyridopteryx ephemeræformis, Orgyia leucostigma, Clisiocampa americana, Hyperchiria io, Hemileuca maia, and Anisota [= Dryocampa] rubicunda to determine the effect of the stinting of food upon the determination of sex; effect of this upon the number of molts and the longevity of Orgyia leucostigma and Megatoma serra; note on alternation of generations in Cynips [= Andricus] quercus-operator and C. [=A.] quercus-operatola; nature of parthenogenesis.

- 1353. RILEY, C. V. Cotton caterpillar.—Boll-worm. <Rural Alabamian, October, 1873. S.-b. No. 16, p. 121.
  - Criticism of recent articles on Anomis [= Aletia] xylina, Heliothis armigera, and Phylloxera vastatrix.
- 1354. RILEY, C. V. On the oviposition of the Yucca moth. <Amer. Nat., October, 1873, v. 7, pp. 619-623. Abstract: <Trans. Acad. Sci. St. Louis, 10 December, 1873—25 April, 1874, v. 3, pp. 208-210. Reprint, with slight changes and omissions. <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 131-135, fig. 38.

See No. 1363 for synopsis of contents.

- 1355. RILEY, C. V. Phylloxera: correction. < Gardener's Mo. and Hortic., November, 1873, v. 15, p. 342.
  - Critical review of report of remarks before Academy of Natural Sciences of Philadelphia.
- stages of Apatura lycaon, Fabr., and Apatura herse, Fabr.; with remarks on their synonymy. <Trans. Acad. Sci. St. Louis, 10 December, 1873, v. 3, pp. 193-208, figs. 3-6. Reprint, with slight changes. <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 136-148, figs. 39-42.

Treats of A. lycaon [=celtis] and A.herse [=clyton]. See No. 1363 for synopsis of contents.

1357. RILEY, V. C. Economic entomology. <Trans. Kansas State Board Agric. for 1872, 1873, pp. 292–325, 18 figs. Extract: <Sci. Amer.

Characterization of entomology; importance of and means against noxious insects; list of imported noxious insects and plants; chapters on Anisota [=Dryocampa rubicunda], Eriosoma pyri [= Schizoneura lanigera], Paleacrita vernata, Galleria cereana, Œstrus ovis, Bruchus pisi, Macrodactylus subspinosus, Conotrachelus nenuphar, and Nysius destructor [= angustatus]. In general, descriptions and figures of the several stages and accounts of the habits and food-plants of and means against these insects, with some accounts and figures of their enemics and parasites, are given. Describes especially larva of Anisota [= D.] rubicunda and of Paleacrita vernata and of all active stages of Nysius destructor [= angustatus]. Figures larva, puparium, and imago of Pipiza radicum, imagos of Nothrus ovivorus, Microgaster [= Apanteles] militaris, Calosoma scrutator, C. calidum, and Blissus leucopterus and imago and nests of Eumenes fraternus.

Some of the chapters are based upon and some are reprinted from the 1st, 2d, and 3d Ann. Repts. State Ent. Mo.

- 1358. RILEY, C. V. Curculios on pears. <Ill. Journ. Agric., 1873. S.-b. No. 16, pp. 109-110, figs. 1-2.
  - Habits, history, and means against Conotrachelus nenuphar, C. cratægi, and Anthonomus quadrigibbus; figures the two last-named species.
- 1359. RILEY, C. V. Length of thread of the silk-worm. < Popular Sci. Monthly, February, 1874, v. 4, p. 508.
  - Correction of statements in A. de Quatrefage's "Silk-worms and sericulture" as to the length and weight of the fiber in a single cocoon of Sericaria mori.

| 1360. | RILEY, C. V. A new (?) ægerian maple-borer. <amer. n<br="">February, 1874, v. 8, pp. 123-124.</amer.>  | ſat.,                |
|-------|--|----------------------|
|       | Critical review of P. Gennadins's "A new ægerian maple-borer." Trochi acericolum is the well-known Ægeria acerni, injurious to maple-trees.  | lium                 |
| 1361. | RILEY, C. V. Entomology in Missouri. <amer. 181–188.<="" 1874,="" 8,="" mar.="" nat.,="" pp.="" td="" v.=""><td>rch,</td></amer.>  | rch,                 |
|       | Reply to criticisms of A. S. Paekard; discussion on the number of segm in the head of an insect, on elassification, and on <i>Mytilaspis pomicon</i> [=pomorum].   |                      |
| 1362. | RILEY, C. V. Economic entomology. < Amer. Nat., March, 18 v. 8, pp. 189-190.   | 874,                 |
|       | Demand for more attention to and better representation of the agricult interests of the country. Inadequacy of measures propounded for wholesale destruction of noxious insects.   |                      |
| 1363. | RILEY, C. V. Sixth annual report on the noxious, beneficial, other insects of the State of Missouri, made to the State Bo of Agriculture, pursuant to an appropriation for this purp from the legislature of the State. <9th Ann. Rept. State Bo of Agric. for 1873, March, 1874, pp. 169+12, 55 figs. Separa <jefferson 169+12,="" 1874,="" 55="" city,="" figs.<="" march,="" mo.,="" pp.="" td=""><td>oard<br/>pose<br/>pard</td></jefferson> | oard<br>pose<br>pard |
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1364. RILEY, C. V. The Colorado potato-beetle abroad. <N. Y. Tribune, 1 April, 1874. S.-b. No. 10, ρ. 37.

Criticism of some articles on *Doryphora decemlineata* published in Europe; danger of the importation of the insect into Europe, and suggestion of means to prevent such introduction.

1365. RILEY, C. V. Cabbage-lice. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, pp. 33-34.

Answer to letter from Mrs. M. Walker; means against Aphis brassica.

1366. RILEY, C. V. Peach-borers. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, p. 34.

Answer to letter from W. J. Clary; a peach-tree whose base was surrounded by ice in winter was free from borers; this observation of slight significance.

1367. RILEY, C. V. Apply soap. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, p. 34.

Answer to letter from T. H. Wakeley; means against Saperda bivittata [=can-dida] and Chrysobothris femorata.

1368. RILEY, C. V. Meadow enemy. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, p. 34.

Answer to letter from D. Freeman; ravages of a species of *Tipula* in grass lands in California; characters of the genus; habits of and means against the same.

1369. RILEY, C. V. A remedy for the cotton-worm. <N. Y. Tribune, 22 April, 1874. S.-b. No. 10, pp. 25–26. Reprint: <Vicksburg Herald, 1 May, 1874.

Experiments with Paris green; advocacy of its use against Aletia argillacea [=xylina]; directions for and successful results of this use.

1370. RILEY, C. V. Descriptions of two new subterranean mites. <a href="trans.Acad.Sci.St.Louis">trans.Acad.Sci.St.Louis</a>, 25 April, 1874, v. 3, pp. 215–216, figs. 8–9.

Description and figures of Tyroglyphus phylloxera n. sp. [p. 215] and of Hoplophora arctata n. sp. [p. 216]; food-habits of the same,

- 1371. RILEY, C. V. The habits of *Polistes* and *Pelopœus*. <Amer. Nat., April, 1874, v. 8, pp. 229-231.
  - Critical review of P. R. Uhler's article "On a remarkable wasp's nest found in a stump in Maryland;" probably the nests and specimens of Pelopaus lunatus [= cementarius] were mistaken for those of Polistes fuscatus [= metricus], in which case the observations criticised present no remarkable features.
- 1372. RILEY, C. V. The plum Curculio; natural history and how to catch him. <N. Y. Semi-weekly Tribune, 1 May, 1874. S.-b. No. 10, pp. 18–19; 38–40. Extract: <Cultivator and Country Gentleman, 14 May, 1874, v. 39, p. 310. <New England Farmer, 18 July, 1874, [v. 53,] n. s., v. 29, p. 1. See: <Indust. Record, 5 February, 1875. S.-b. No. 16, pp. 46–48.
  - Natural history of and means against Conotrachelus nenuphar; figures of the several stages of the insect and of machines for catching the same.
- 1373. RILEY, C. V. The apple-worm; natural history; remedies. <N. Y. Tribune, 20 May, 1874. S.-b. No. 10, pp. 8-9; 37-38. Description and figures of the several stages of Carpocapsa pomonella; habits of and means against the same.
- 1374. RILEY, C. V. The grape Phylloxera. < Popular Sci. Monthly, May, 1874, v. 5, pp. 1-16, 7 figs. Reprinted, with slight changes, from <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 30-46.

  See No. 1363 for synopsis of contents.
- 1375. RILEY, C. V. Rose chafers on grape-vines. <Colman's Rural World, 20 June, 1874, fig. S.-b. No. 17, pp. 103, 104.

  Natural history and means against Macrodactylus subspinosus; figure of the
- 1376. RILEY, C. V. More about the grape-vine pest. < Popular Sci. Monthly, June, 1874, v. 5, pp. 158-170, 10 figs. Reprinted, with changes and omissions, from <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 47-60, 64-65.
  - See No. 1363 for synopsis of contents.

same.

- 1377. RILEY, C. V. Scale insects on magnolia. <N. Y. Tribune, 15 July, 1874. S.-b. No. 10, p. 24.
  - Answer to inquiry of R. H. Day; occurrence of an undescribed *Lecanium* sp.? on the leaves of *Magnolia fuscata*.
- 1378. RILEY, C. V. Confounding friend with foe. <N. Y. Tribune, 15 July, 1874, 2 figs. S.-b. No. 10, p. 24.
  - Answer to inquiry of E. J. Day; usefulness of Arma [= Podisus] spinosus figure of the same. Injury to plums by Anthonomus prunicida [=Coccotorus scutellaris]; figure of and means against the same.
- 1379. RILEY, C. V. The Colorado potato-beetle in New York. <N. Y. Tribune, 15 July, 1874. S.-b. No. 10, p. 24.
  - Answer to letter from J. H. P.; eastern limit of the range of Doryphora decemberata in 1873 and 1874.

- 1380. RILEY, C. V. Large willow-worm. <N. Y. Tribune, 15 July, 1874. S.-b. No. 10, p. 24.
  - Answer to letter of J. H. P.; food-plants, habits, and means against Cimber laportei [= americana].
- 1381. RILEY, C. V. Black blister beetles on potatoes. <N.Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
  - Answer to inquiry of A. Barr; ravages of and means against *Epicauta puncti-* collis.
- 1382. RILEY, C. V. Pear-tree slug. <N. Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
  - Answer to letter of C. S. B.; means against Selandria [= Eriocampa] cerasi.
- 1383. RILEY, C. V. The plug-ugly theory. <N. Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
  - Answer to letter of O. J. B.; insertion of sulphur, calomel, and similar powders in the trunks of trees has no effect upon the sap or upon the insects which injure the trees.
- 1384. RILEY, C. V. Cockscomb elm-gall. <N. Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
  - Answer to inquiry of J. S. Ruby; Thelaxes [== Colopha] ulmicola forms excrescences on the American elm.
- 1385. RILEY, C. V. Pitcher-plant insects. <Hartford [Conn.] Daily Courant, 15 August, 1874, v. 38, No. 195, p. 1. See: <N. Y. Tribune Extra: Lecture and Letter series No. 21, August, 1874, pp. 56–58, fig. Reprint: <Nature, 8 October, 1874, v. 10, pp. 463–465, figs. 1–2. Abstract: <Sci. Amer., 12 September, 1874 [v. 45], n. s., v. 31, p. 168. <Amer. Nat., November, 1874, v. 8, pp. 684–687. Reprint of abstract: <Hardwicke's Science Gossip, December, 1874, v. 10, pp. 272–275, figs. 179–182. Extract: <Ca. Ent., November, 1874, v. 6, pp. 207–214, figs. 25–26. Reprint of extract: <Proc. Amer. Assoc. Adv. Sci. for 1874, June, 1875, v. 23, pp. 18–25, 2 figs. Separate of reprint: <Salem, Mass., December, 1874, pp. 18–25, figs.
  - Insect-catching habits of Sarracenia variolaris; list of its victims; habits and figures of all stages of Xanthoptera [= Exyra] semicrocea and Sarcophaga sarracenia; capture of insects by other plants.
- 1386. RILEY, C. V. On the habits and transformations of Canthon hudsonias, Forst.; the common "tumbledung." <Hartford [Conn.] Daily Courant, 18 August, 1874, No. 11162, v. 38, No. 197, p. 2. Reprint: <N. Y. Tribune Extra: Lecture and Letter series, No. 21, August, 1874, pp. 75-76.
  - Breeding habits and oviposition of Canthon hudsonias [==lavis].
- 1387. RILEY, C. V. On the larval habits of the cantharid genera *Epicauta* and *Henous*. <Hartford [Conn.] Daily Courant, 18 August, 1874, No. 11162, v. 38, No. 197, p. 2. See: <N. Y. Tribune Extra: Lecture and Letter series, No. 21, August, 1874, p. 76.
  - Habits and hypermetamorphosis of Meloe angusticollis; probably parasitic food-habits of young larvæ of Epicauta and Henous; the images phytophagous,

- 1388. RILEY, C. V. Humming-bird moths caught by the tongue. <Moore's Rural New Yorker, 29 August, 1874, v. 30, p. 140. Method of capture of insects, particularly moths by the flowers of *Physian-thus albens*; capture of insects by other flowers.
- 1389. RILEY, C.V. The io moth (Saturnia io). <Illust. Journ. Agric., August, 1874, figs.
  - Answer to inquiry of G. Barter; natural history of Saturnia [= Hyperchiria] io; figures larva and  $\beta$  and  $\varphi$  images.
- 1390. RILEY, C. V. Descriptions and natural history of two insects which brave the dangers of *Sarracenia variolaris*. <Trans. Acad. Sci. St. Louis, 1 September, 1874, v. 3, pp. 235–240, figs. 10–11.
  - Description of leaf of Sarracenia variolaris and its function of entrapping and digesting insects; description and figures of eggs, larva, chrysalis, and imago of Xanthoptera [= Exyra] semi-crocea and larva, puparium and imago of Sarcophaga sarraceniæ n. sp.; habits of the two species; comparison of S. sarraceniæ with S. carnaria and of the genera Musca, Calliphora, and Sarcophaga; notice of A. S. Packard's "Transformation of the common housefly."
- 1391. [RILEY, C. V.] [Discussion on entomology.] <Trans. Ill. State Hortic. Soc. for 1873, 1874, n. s., v. 7, pp. 100-104.

  Description, habits, and means against Anisopteryx; effect of late plowing; enemies of Doryphora 10-lineata; habits of Gastrophilus equi.
- 1392. [RILEY, C. V.] Note on leaf-hopper. <Trans. Ill. State Hortic. Soc. for 1873, 1874, n. s., v. 7, p. 138.

  Means against Erythroneura [= Typhlocyba] vitis.
- 1393. [RILEY, C. V.] [Notes on the strawberry crown borer.] < Trans.

  Ill. State Hortic. Soc. for 1873, 1874, n. s., v. 7, p. 147.

  Description, habits, and means against Tyloderma fragariæ.
- 1394. RILEY, C. V. Lecture on entomology. <Trans. Ill. Hortic. Soc. for 1873, 1874, n. s., v. 7, pp. 172-178, figs. 1-3. Reprint: <3d Ann. Rept. Sec. State Pomol. Soc. Mich. for 1873, 1874, pp. 443-448. Abstract: <Rept. U. S. Commis. Agric. for 1873, 1874, [30 March, 1875], pp. 389-390.
  - Habits of and means against Carpocapsa pomonella; habits, transformations, prolificacy of and means against Phylloxera vastatrix; description and figures of leaf-galls; figures of root- and gall-forms; history and meaning of the word "Phylloxera;" statement by D. B. Wier concerning the invention and use of Wier's apple-worm trap.
- 1395. RILEY, C. V. "Walking-sticks or specters" becoming injurious. <N. Y. Weekly Tribune, 11 November, 1874, fig. S.-b. No. 23, p. 103.
  - Ravages in Yates County, N. Y., vernacular names, habits of, and means against Diapheromera femorata; description of its eggs; figure of imago.
- 1396. RILEY, C. V. Entomological notes. <Sci. Amer., 5 December, 1874 [v. 45], n. s., v. 31, p. 356.
  - Pemphigus imbricator found on beech; vesicatory potato-beetles, Meloidæ; cow manure and cow urine one of the earliest supposed remedies for Phylloxera.

- 1397. RILEY, C. V. The bark-louse. <Beach, A. E. The Science Record for 1874, N. Y., 1874, p. 356.

  Discovery of the male of Mytilaspis conchiformis [=pomorum].
- 1398. RILEY, C. V. Codling-moth heresies. <N. Y. Tribune, 2 January, 1875. S. b. No. 13, p. 163.

  Criticism of paper of S. B. Peck: Carnocansa, nomonella, confines its attacks
  - Criticism of paper of S. B. Peck; Carpocapsa pomonella eonfines its attacks to one apple and does not enter the ground.
- 1399. RILEY, C. V. Shall we scrape our trees? <N. Y. Tribune, 6
  February, 1875. S.-b. No. 10, p. 10.
  - Careful scraping of trees early in spring is beneficial as a safegnard against the attacks of many injurious insects.
- 1400. RILEY, C. V. What are army-worms? <N. Y. semi-weekly Tribune, 6 February, 1875.
  - Differences between Laphygma frugiperda and Leucania unipuncta.
- 1401. RILEY, C. V. The hickory bark-borer, Scolytus caryæ. <Colman's Rural World, 6 February, 1875. S.-b. No. 17, p. 105.

  Natural history of Scolytus caryæ [= 4-spinosus].
- 1402. RILEY, C. V. Genuine vs. bogus chinch-bugs. <N. Y. Tribune, 10 February, 1875, figs. S.-b. No. 10, p. 10.
  - Answer to inquiry of C. H. Cushing; food-habits and figures of Nysius destructor [=angustatus] and Blissus leucopterus; larva of Deilephila lineata feeds on purslane.
- 1403. RILEY, C. V. Remedies for Phylloxera. <N. Y. Tribune, 10 February, 1875. S.-b. No. 10, p. 22.
  - At present no insecticide is effective against *Phylloxera vastatrix*; grafting of more susceptible varieties on the roots of the least susceptible advised.
- 1404. RILEY, C. V. Newest facts of grape Phylloxera. <N. Y. Tribune, 10 February, 1875. S.-b. No. 10, pp. 21-22.
  - Succession of different forms of individuals in the cycle of development of *Phylloxera* described; seasons at which the different forms appear; places in which eggs are laid by the winged females.
- 1405. RILEY, C. V. Is the Colorado beetle poisonous? <N. Y. Weekly Tribune, 17 February, 1875. S.-b. No. 10, p. 9.
  - Insists upon the poisonous nature of the fumes from scalded or burning masses of *Doryphora decemlineata*, in opposition to statements by Prof. T. J. Burrill.
- 1406. RILEY, C. V. Notes of Phylloxera. <N. Y. Tribune, 4 March, 1875. S.-b. No. 10, pp. 20–21.
  - Critical review of A. S. Fuller's "Distribution of the grape-louse;" maintains the specific identity of the so-called gall-inhabiting and root-inhabiting forms of *Phylloxera*, and the North American origin of this insect.
- 1407. [RILEY, C. V.] The Colorado potato-beetle abroad. <N. Y. Weekly Tribune, 17 March, 1875. S.-b. No. 10, pp. 14-15.
  - Statement and criticism of measures adopted by several European Governments to prevent the introduction of *Doryphora decemlineata* into their countries.

- 1408. RILEY, C. V. Bud-eating insects. <Cultivator and Country Gentleman, 25 March, 1875, v. 40, p. 183.
  - Habits, food-plants, and means against Agrotis scandens; means against field eut-worms.
- 1409. RILEY, C. V. Description of a new species of Agrotis. < Proc. Bost. Soc. Nat. Hist., March, 1875, v. 17, pp. 286–288. Description of Agrotis morrisoniana n. sp. [p. 286].
- 1410. RILEY, C. V. On the summer dormancy of the larva of *Phyciodes nycteis*, Doubleday, with remarks on the natural history of the species. <Proc. Amer. Assoc. Adv. Sci. for 1874, 4 June, 1875, v. 23, pp. 108–112. Separate: <Salem, Mass., March, 1875, pp. 108–112. Abstract: <Hartford [Conn.] Daily Courant, 18 August, 1874, No. 11162, v. 38, No. 197, p. 2. See: <N. Y. Tribune Extra: Lecture and Letter series, No. 21, August, 1874, p. 75.
  - Observations on *Phyciodes nycleis* and *Argynnis bellona*; significance of the same; detailed description of the larva and pupa of *P. nycleis*.
- 1411. RILEY, C. V. Descriptions of two new moths. <Trans. Acad. Sci. St. Louis, 1 February [March], 1875, v. 3, pp. 240-242, figs. 12-13.
  - Descriptions and figures of Xanthoptera [= Exyra] ridingsii n. sp. and Cerura multiscripta n. sp.
- **1412.** RILEY, C. V. The climate for Doryphora. <N. Y. Tribune, 2 April, 1875. S.-b. No. 10, p. 16.
  - Comments on letter from D. L. Garver; *Doryphora decemlineata* would be likely to thrive as well in the elimates of Europe as in North America; its transportation across the ocean is not improbable.
- 1413. RILEY, C. V. [On an Acridium eaten out by ants.]. <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 102 Proc.
  - Verbal communication; inner soft parts of an Acridium americanum eaten ont by Myrmica minuta.
- 1414. RILEY, C. V. [On the chrysalis of *Pronuba yuccasella*.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 106 Proc.
  - Verbal communication; adaptation of pupa of Pronuba yuccasella to its needs of prying its ways through the soil.
- 1415. RILEY, C.V. [On regulating sex in insects.] < Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 108 Proc.
  - Verbal communication; critical review of Mrs. Treat's "Controlling sex in butterflies"; female insects need more nourishment than the males, but sex is determined in all animals at conception.
- 1416. RILEY, C.V. [On the peculiarities of Nephila plumipes.] < Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 109 Proc.
  - Verbal communication; comparison of the structure of male and female Nephila plumipes; habits and silk-production of the female.
- 1417. RILEY, C. V. [On the peculiarities of the Mexican honey-ant.] < Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 109 Proc.
  - · Verbal communication; structural and functional division of the neuters of Myrmecocystus mexicanus into two distinct kinds.

- 1418. RILEY, C. V. [On the peculiarities of *Physianthus albens*.] < Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 109 Proc.
  - Verbal communication; the flowers of *Physianthus albens* so constructed as to hold large *Sphingidæ* fast by the tongue.
- 1419. RILEY, C. V. [On the capture of moths by *Physianthus albens*.] < Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 115 Proc. Reprinted, with changes, from < Moore's Rural New Yorker, 29 August, 1874, v. 30, p. 140.
  - Verbal communication; method of capture of insects, particularly moths, by the flowers of *Physianthus albens*; records the capture of a number of *Noctuidæ* and of *Sphingidæ*, especially *Deilephila lineata*; *Nerium oleander* and *Enothera grandiflora* are said to capture Sphinx-moths in Europe.
- 1420. RILEY, C. V. [On the Yucca borer.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 139 Proc.
  - Verbal communication; entomological interest attaching to the Yucca; abode and synonymy of Megathymus yuccæ.
- 1421. RILEY, C. V. [New biological facts regarding the grape Phylloxera.] < Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, pp. 147–148 Proc.
  - Sequence of development of certain forms of *Phylloxera*; sexual forms of three species of *Phylloxera* obtained; alleged discovery by J. Lichtenstein of the winged form of *P. vastatrix* on *Quercus coccifera* in Europe, discredited, and this form considered by E. G. Balbiani as a new species, named *P. lichtensteinii*.
- 1422. RILEY, C. V. [On the connection of locust invasions with the occurrence of drought.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 163 Proc.
  - Verbal communication; no connection between the occurrence of drought and of locust invasions.
- 1423. RILEY, C. V. Seventh annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture pursuant to an appropriation for this purpose from the legislature of the State. <10th Ann. Rept. State Board of Agric. for 1874, April, 1875, pp. 7 + 196 + 4, 40 figs. Separate: <Jefferson City, Mo., April, 1875, pp. 7 + 196 + 4, 40 figs.

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- 1423. RILEY, C. V.—Continued.
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- 1424. RILEY, C. V. The ways of bag-worms. <N. Y. Semi-weekly Tribune, 14 April, 1875, 3 figs. S.-b. No. 10, pp. 11, 36.
  - Figure of the larva-case of an undetermined species of *Psychidw* and of the several stages of *Thyridopteryx ephemeraformis*; habits of and means against the latter.
- 1425. [RILEY, C. V.] [Poisonous qualities of the Colorado potatobeetle.] <N. Y. Tribune, 14 April, 1875. S.-b. No. 10, p. 17, 34. Mentions instances of poisoning from the fumes given out by scalded or crushed masses of *Doryphora decemlineata*.
- 1426. [RILEY, C. V.] Cure for canker-worm. <N. Y. Tribune, 21 April, 1875. S.-b. No. 10, p. 25.
  - Paris green recommended for destruction of canker-worms when other remedies are lacking. Paris green not to be used against all insects.
- 1427. [RILEY, C. V.] Paris green: Its effects on plants and soils, and through them on man. <N. Y. Tribune, 12 May, 1875. S.-b. No. 10, pp. 15–16; 34–35.

Paris green is not injurious to plants or the soil, nor dangerous to man when properly applied.

- 1428. [RILEY, C. V.] Swellings on roots of Ampelopsis. <Colman's Rural World, 5 June, 1875. S.-b. No. 10, p. 1.
  - Answer to letter of H. Hilker; swellings on roots of Ampelopsis possibly occasioned by root-lice, but not by Phylloxera.
- 1429. RILEY, C. V. Apple-tree plant-lice. < Colman's Rural World, 5 June, 1875.
  - Answer to letter of A. Moyer; occurrence of and means against Aphis mali.
- 1430. RILEY, C. V. [Torrubia elongata, the white-grub fungus.] < Colman's Rural World, 12 June, 1875, v—, p—.
  - Torrubia clongata proposed as the name for the white-grub fungus; figures of the same.
  - 1431. RILEY, C. V. The Colorado potato-beetle, *Doryphora decemline-ata*. <Garden [London], 24 July, 1875, v. 8, pp. 71–72, 5 figs. S.-b. No. 23, p. —.
    - Description and figures of all stages of Doryphora decemlineata and D. juneta; migrations, habits, prolificacy, enemies, and parasites of D. decemlineata; means against it; the use of Paris green; probability and probable method of its introduction into Europe and means of preventing such introduction; figures Lydella [= Exorista] doryphora, Harpaetor [= Milyas] cinctus, Arma f= Podisus] spinosus, and Hippodamia convergens.

- 1432. RILEY, C. V. Locusts vs. chinch-bugs. <N. Y. Tribune, 4 August, 1875. S.-b. No. 10, p. 40.
  - Locust ravages are likely to prevent serious injury by *Blissus leucopterus*; the latter more noticeable than usual; excessive rains in 1875, also unfavorable to the development of *Blissus leucopterus*.
- 1433. RILEY, C. V. No locust injury in Kansas and Missouri this fall. <N. Y. Tribune, 1 September, 1875. S.-b. No. 10, p. 166.
  - Predicts immunity from attacks of Caloptenus spretus in the fall of 1875 in Kansas and Missouri.
- 1434. RILEY, C. V. Prof. Riley and the locusts. <St. Louis Daily Globe Democrat, 4 September, 1875, v. 1, No. 108, p. 3. S.-b. No. 10, pp. 158-159.
  - Reply to C. A. Davis's "Prof. Riley and the locusts;" food-plants, habits, parasites, and period of development of *Caloptenus spretus*; need of more extended investigation of this insect in its native haunts and breeding places.
- 1435. RILEY, C. V. The grape-leaf gall. <Cultivator and Country Gentleman, 9 September, 1875, v. 40, p. 567.

  Identity of the root and leaf-forms of Phylloxera vastatrix.
- 1436. RILEY, C. V. White-grub fungus. <N. Y. Tribune, 6 October, 1875. S.-b. No. 10, p. 26.
  - Answer to inquiry of A. C. G.; brief history of *Torrubia elongata*, a parasite of *Lachnosterna fusca*.
- 1437. RILEY, C. V. Flying locusts in Illinois. < Cultivator and Country Gentleman, 28 October, 1875, v. 40, p. 679.
  - Caloptenus spretus confounded with C. femur-rubrum by B. F. J.; C. spretus does not occur in Illinois.
- 1438. RILEY, C. V. Remarks on canker-worms and description of a new genus of *Phalænidæ*. <Trans. Acad. Sci. St. Louis, 5 November, 1875, v. 3, pp. 273–280, figs. 14–21. Separate: <St. Louis, Mo., 1875, pp. 8, figs. Reprint: <8th Ann. Rept. State Ent. Mo., May, 1876, pp. 12–18, figs. 3–10. Notice: <Ca. Ent., November, 1875, v. 7, p. 219. <Proc. Bost. Soc. Nat. Hist., February, 1876, v. 18, p. 201.
  - Treats of Paleacrita [n. g.] vernata and Anisopteryx pometaria; see No. 1482 for synopsis of contents.
- 1439. RILEY, C. V. Notes on the natural history of the grape Phylloxera, *Phylloxera vastatrix*, Planchon. <Trans. Acad. Sci. St. Louis, 5 November, 1875, v. 3, pp. 281–287, fig. 22. Extract: <Amer. Nat., June, 1881, v. 15, pp. 483–484.
  - Discovery of the nidus in which eggs are deposited by the winged female of *Phylloxera vastatrix*; development, habits, description, and figures of the same; description of the male and of the impregnated egg; figure of the male of *P. earyweaulis*; summary of the natural history of *P. vastatrix*.
- 1440. [RILEY, C. V.] Grubs and guess-work. <N. Y. Semi-weekly Tribune, 12 November, 1875. S.-b. No. 10, pp. 17-18.
  - Characterizes some subdivisions of the Lamellieornia by their habits; contrasts the larvæ, imagos, and habits of Lachnosterna quercina [=fusca] and Lygyrus relictus; means against the former.

- 1441. R[ILEY], C. V. Entomological. Apple-tree borers; timber encourages them; new bag-worm. <Colman's Rural World, 13 November, 1875. S.-b. No. 10, p. 188.
  - Timber-trees near apple orchards increase the likelihood of the attacks of Saperda bivittata [=candida] upon the apple-trees; habits and food-plants of Psyche confederata.
- 1442. RILEY, C. V. The army worm; an important point yet to ascertain in its history. How it comes and goes; its natural enemies; preventive measures. <N. Y. Tribune, 16 November, 1875, 8 figs. S. b. No. 10, pp. 29-31; 31-33.
  - Various applications of the name "army-worm;" seasons, habits, and natural enemies of and means against Leucania unipuncta; supposed method of oviposition; figures of it in its several stages, of Exorista flavicanda, Microgaster [= Apanteles] militaris, Ophion purgatum, and Pezomachus minimus, and of cocoons of the last; habits of these parasites.
- 1443. RILEY, C. V. The flying locusts in Illinois. <Cultivator and Country Gentleman, 25 November, 1875, v. 40, p. 744. Extent of swarms flying south over Kansas and Nebraska on September (4th?).
- 1444. R[ILEY], C. V. Scabby potatoes. <N. Y. Tribune, 15 December, 1875. S.-b. No. 10, pp. 20, 29.

  The scab in potatoes is caused by imperfectly studied Acarina.
- 1445. [RILEY, C. V.] Not the Hessian-fly. <N. Y. Tribune, 15 December, 1875. S.-b. No. 10, pp. 20, 29.</li>
  Answer to inquiry of J. H. K.; significance of the name and habits of Aphodius inquinatus.
- 1446. R[ILEY], C. V. How to destroy locusts. <Colman's Rural World, 23 December, 1875. S.-b. No. 10, p. 185.

  Answer to letter of C. Herschel; means against Aerididæ; recommends flooding and ditching.
- 1447. RILEY, C. V. Paris green as an insect destroyer. <N. Y. Tribune, 28 December, 1875. S.-b. No. 10, pp. 13-14; 28-29. Paris green as a means against *Doryphora decembineata*; R. C. Kedzie's investigations show that Paris green is not deleterious to the soil or the crops.
- 1448. RILEY, C. V. Oak apple. <Amer. Cyclopædia, 1875, v. 12, pp. 558-559, 3 figs. S.-b. No. 14, pp. 47-48.

  Description of galls of Cycline terminalis. C. I.— Amphibaline Laurence. spenaified.
  - Description of galls of Cynips terminalis, C. [= Amphibolips] quercus-spongifica, and C. [=A.] q.-inanis; manner of their formation; figures the latter two galls and a parent fly; nature of galls and problems involved in their study.

of P. vastatrix; figures its several forms and the galls formed by it; history

1449. [RILEY, C. V.] Phylloxera. <Amer. Cyclopædia, 1875, v. 13, pp. 477-480, figs. 1-8. S.-b. No. 10, pp. 84-87. Habits, food-plants, and characters of the genus *Phylloxera*; natural history

of the ravages in the vineyards of France.

- 1450. [RILEY, C. V.] Potato-bug. <Amer. Cyclopædia, 1875, v. 13, pp. 768-771, fig. 1-7. S. b. No. 10, pp. 89-92.
  - Food-plants, original home, geographical distribution, natural history, enemies of, and means against *Doryphora decembinata*; figures of it and of *Lydella* [= Exorista] doryphora, Arma [= Podisus] spinosus, Harpactor [= Milyas] cinctus, Mysia [= Anatis] 15-punctata, and Doryphora juncta.
- 1451. RILEY, C.V. Rocky Mountain locust. < Amer. Cyclopædia, 1875, v. 14, pp. 371-374, figs. 1-10.
  - Ravages, description, natural history, migrations, and enemies of and means against Caloptenus spretus; figures of it with details of its structure and habits; figures C. femur-rubrum, Astoma gryllarium [= Trombidium locustarum], Trombidium sericeum, and Sarcophaga carnaria.
- 1452. RILEY, C. V. The hateful or Rocky Mountain locust, Caloptenus spretus. <N. Y. Tribune, 1875. Reprint: <Trans. Kans. State Hortic. Soc. for 1874, 1875, v. 4, pp. 172–176.
  - Answer to inquiry of Z. F. Hopkins; probable limit of the ravages and range of Caloptenus spretus in Kansas, Missouri, and neighboring States in 1875; means against and vernacular name of this species; vernacular names of Acridide and Locustide in general.
- 1453. RILEY, C. V. Prairie fires and hateful locusts: is there any connection between them? <N. Y. Tribune, 1875. Reprint: <Trans. Kans. State Hortic. Soc. for 1874–775, v. 4, pp. 176–180.
  - Criticism of the effects of the drought, hot winds, locusts, and short erops in Kansas eaused by the burning of the prairie grasses as stated in Kansas Farmer, 23 September, 1874; benefits resulting from prairie fires by the destruction of hibernating Blissus leucopterus, Nysius destructor [= angustatus], etc.; relations of prairie fires to the origin and maintenance of prairies.
- 1454. RILEY, C. V. [Address on entomology.] <Trans. Ill. State Hortic. Soc. for 1874, 1875, n. s., v. 8, pp. 103-111. Partial reprint: <Trans. Kans. State Hortic. Soc. for 1874, 1875, v. 4, pp. 103-104.
  - Ægeria rubi [= Bembecia marginata] injurious to blackberry and raspberry; the eause and cure of scab in apples; ravages, food-plants, seasons, habits, and means against Chrysobothris femorata; evidence for the identity of the leaf-and root-forms of Phylloxera vastatrix; means against the same.
- 1455. RILEY, C. V. Discussion of the honey-bee. <Trans. Ill. State Hortic. Soc. for 1874, 1875, n. s., v. 8, pp. 131-132.
  - Apis mellifica as an enemy to horticulture; importance of insects in the fertilization of flowers.
- 1456. RILEY, C. V. Notes on locusts. <Trans. Ill. State Hortic. Soc. for 1874, 1875, n. s., v. 8, pp. 136-137.

  Native habitat of Caloptenus spretus.
- 1457. RILEY, C. V. Nonsense about the Phylloxera. <Colman's Rural World, 12 January, 1876. S.-b. No. 10, p. 3. See: <N. Y. Tribune, 1876. S.-b. No. 10, p. 27.
  - There is no such species as the American corn-grape, which is reported capable of resisting the attacks of *Phylloxera vastatrix*.

- 1458. RILEY, C. V. Small borer in apple-twig. <Colman's Rural World, 26 January, 1876. S.-b. No. 10, p. 1.
  - Answer to letter of F. Holsinger; description and habits of Psenocerus supernotatus.
- 1459. RILEY, C. V. Worms on cottonwood. <Colman's Rural World, 26 January, 1876. S.-b. No. 10, p. 1.
  - Answer to letter of J. H. Davidson; occurrence of larvæ of Drasteria erechthea on Populus monilifera and on Trifolium; description of the imago.
- 1460. RILEY, C. V. Ailanthus silk-worm in Missouri. < Colman's Rural World, 27 January, 1876. S.-b. No. 10, p. 2.
  - Answer to letter of "Subscriber;" extent and unprofitableness of the culture of Samia [= Atlaeus] eynthia; naturalization of the worm in the United States.
- 1461. R[ILEY], C. V. Cause of smut in wheat. <Colman's Rural World, 26 January, 1876. S.-b. No. 10, p. 2.
  - Critical review of a report by Pulaski Grange, Tenn., on the cause of smut in wheat; absurdity of the report; occurrence of Brachytarsus variegatus in the smut, and of larvæ of Cecidomyia, Meromyza, and Chlorops in the lower joints of wheat; smut caused by Ustilago segetum.
- 1462. RILEY, C. V. Colorado potato-beetle's native home. <N. Y. Tribune, 9 February, 1876. S.-b. No. 10, pp. 12-13.
  - Geographical distribution of Doryphora decemlineata prior to 1859.
- 1463. RILEY, C. V. An entomological question. < Prairie Farmer, 26 February, 1876, v. 47, p. 68. S.-b. No. 10, pp. 4, 5; No. 42, pp. 76, 77. See: < Prairie Farmer, 4 March, 1876, v. 47, p. 76. S.-b. No. 10, p. 4.
  - Reply to Proximo's "An entomological question;" commendation of legislative efforts to effect the appointment of a national entomological commission; text of the two bills introduced into Congress; criticism of the same.
- 1464. RILEY, C. V. Insect ravages. An interesting letter from Prof. C. V. Riley. How to protect our agricultural interests; legislation, wise and otherwise; the duty of Congress. <St. Louis Daily Globe-Democrat, 4 March, 1876, v. 1, p. 3. S.-b. No. 10, pp. 5-8.
  - Importance and extent of injuries inflicted by insects in North America; notice of existing legislation upon means against injurious insects; statement of legislation needed for protection against locusts; criticism of bills introduced into Congress for the appointment of a national entomological commission.
- 1465. RILEY, C. V. Notes on the Yucca borer, *Megathymus yuccæ*, Walk. <Trans. Acad. Sci. St. Louis, 10 January-23 March, 1876, v. 3, pp. 323-344, figs. 25-31. Separate: <St. Louis, Mo., January, 1876, pp. 23, figs. 25-31. Reprint: <Sth Ann. Rept. State Ent. Mo., May, 1876, pp. 169-182, figs. 40-55.

See No. 1482 for synopsis of contents; see No. 1602,

- 1466. RILEY, C. V. Entomology. An interesting lecture on the insect world. The subject considered both practically and scientifically. <St. Louis Daily Globe-Democrat, 25 March, 1876, v. 1, p. 3. S.-b. No. 10, pp. 161-164. Reprint, with omissions: <Ware's Valley Monthly, August, 1876, v. —, pp. 281-289. S.-b. No. 14, pp. 163-167.
  - Definition of entomology; claims of the science as a liberalizing study; its economic importance; metamorphoses, abundance, and almost omnipresence of insects.
- 1467. [RILEY, C. V.] The insect world. Lecture by Professor Riley at Washington University. A practical subject for fruit-growers. <St. Louis Republican, 26 March, 1876. S.-b. No. 10, pp. 178, 179.
  - Advantages and interest of the study of insects as compared with that of other animals; economic importance of the study; ravages of *Glossina morsitans*.
- 1468. RILEY, C. V. Legislation in regard to insects injurious to agriculture. <Nation, 30 March, 1876, v. 22, p. 208.

  Amount of insect injuries in the United States; demand for an independent
  - Amount of insect injuries in the United States; demand for an independent commission; duties and limits of such a commission.
- 1469. RILEY, C. V. Entomology. Another lecture by Professor Riley. How to counteract the ravages of insects; direct remedies; practical hints to farmers, etc. Some of the duties of the State entomologist. <St. Louis Daily Globe-Democrat, 1 April, 1876, v. 1, p. 3. S. b. No. 10, pp. 135–138; 179–184. Reprint, with omissions: <Ware's Valley Monthly, September, 1876, v. —, pp. 369–380. S. b. No. 14, pp. 168–173.
  - Classification of means against insects; cause of the destructive occurrence of insects; importation of foreign pests; history of the introduction and spread of *Pieris rapæ*, *Phylloxera vastatrix*, and *Doryphora decemlineata*; natural history of these insects; spread of insects by small degrees; advantageous means against certain insects; encouragement of enemies of and parasites on noxions insects; need of distinguishing friends from foes; need of co-operation and of legislation for the destruction of insects; duties of a State entomologist.
- 1470. [RILEY, C. V.] Scarlet mite. < Colman's Rural World, 12 April, 1876, fig. S.-b. No. 10, p. 160.
  - Answer to letter of G. W. Barnes; occurrence, habits, and figure of *Trom-bidium sericeum*; habits of *T. holoscriceum*; use of *T. tinctorium* as a dye.
- 1471. RILEY, C. V. Hibernation of Amphipyra [=Pyrophila] pyramidoides. <Psyche, March [13 April], 1876, v. 1, p. 152.
  - Extract from 3d Ann. Rept. State Ent. Mo., pp. 72-73, with additional note; this species sometimes hibernates as a pnpa, and doubtless frequently as a moth.
- 1472. RILEY, C. V. Bag-worms and borers. How to protect our shade-trees and insure their growth. How to render shade-trees healthy. Letter from the State entomologist. 

  \$\leq\$St. Louis Re-

- 1472. RILEY, C. V.—Continued.
  - publican, 14 April, 1876, No. 16843, p. 3, 3 figs. S.-b. No. 10, pp. 173–175; 175–178.
  - Causes of the death of shade-trees in the city of St. Louis; description, figures, and natural history of and means against Thyridopteryx ephemera-formis and Chrysobothris femorata.
- 1473. RILEY, C. V. The locust plague; how to avert it. < Proc. Amer. Assoc. Adv. Sci. for 1875, 1876, v. 24, pp. 215-222. Separate: < Salem, April, 1876, pp. 215-222.
  - Extent of the ravages of Caloptenus spretus in 1873, 1874, and 1875; classification of and special remarks on the several means to be employed against the same; need of more extensive investigation of the insect in its native haunts and breeding places.
- 1474. R[ILEY], C. V. Honey locust weevil. <Colman's Rural World, 26 April, 1876.
  - Answer to inquiry of E. H. B.; larva of Spermophagus robiniæ has legs and spius a cocoon.
- 1475. RILEY, C. V. Apple and peach borers. < Colman's Rural World, 9 May, 1876. S.-b. No. 16, p. 11.
  - Answer to inquiry of F. H.; habits, natural history, and means against Chrysobothris femorata and Egeria [= Sannina] exitiosa.
- 1476. RILEY, C. V. Notes on the codling-moth. <Colman's Rural World, 17 May, 1876. S.-b. No. 13, p. 153.

  Natural history of Carpocapsa pomonella.
- 1477. RILEY, C. V. Plums and cotton. <N. Y. Weekly Tribune, 17
  May, 1876. S.-b. No. 10, p. 167.
  - Answer to letter of J. C.; a belt of cotton-batting around the trunk of the tree is no protection against the injury to plums by Conotrachclus nenuphar.
- 1478. RILEY, C. V. Rose-bug remedy. <N. Y. Weekly Tribune, 17 May, 1876, fig. S.-b. No. 10, p. 167.
  - Answer to letter of Mrs. S. P. Smith; description, figure, habits, and preferred food-plants of and means against *Macrodactylus subspinosus*.
- 1479. RILEY, C. V. Smut in wheat. <N. Y. Weekly Tribune, 17 May, 1876. S.-b. No. 10, pp. 167–168. Reprint: <Colman's Rural World, 14 June, 1876. S.-b. No. 10, p. 169.
  - Critical review of two quoted communications by A. S. and by L. Heskett, on the cause of smut in wheat; smut caused by the growth of *Ustilago segetum*; Brachytarsus variegatus breeds in various smuts; description of the beetle.
- 1480. [RILEY, C. V.] Potato-beetle; progress. <N. Y. Weekly Tribune, 17 May, 1876. S.-b. No. 10, p. 168.
  - Arrival of Doryphora decemlineata at the Atlantic coast; its ravages there and means against them.
- 1481. RILEY, C. V. Locusts as food for man. <Proc. Amer. Assoc. Adv. Sci. for 1875, 1876, v. 24, pp. 208–214. Separate: <Salem, May, 1876, pp. 208–214.
  - Reference to previous writings on the use of locusts as food for man; historical evidence of the extensive use of locusts as food; methods of preparing locusts for food; species used hitherto; use of *Caloptenus spretus*; peculiarities of individual taste or national custom.

| 1482. | RILEY, C. V. Eighth annual report on the noxious, benefit and other insects of the State of Missouri, made to the State of Agriculture, pursuant to an appropriation for purpose from the legislature of the State. <11th Ann. It State Board of Agric. for 1875, May, 1876, pp. 185+4, 55   | state<br>this<br>Rept. |
|-------|--|------------------------|
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1483. RILEY, C. V. Is the Colorado potato-beetle poisonous? < Colman's Rural World, 7 June, 1876. S.-b. No. 10, pp. 164-165. Extract from the 8th Ann. Rept. State Ent. Mo., pp. 10-12; abstract and critical review of Grote and Kayser's "Are potato-bugs poisonous?"; considers the experiments inconclusive.

1484. [RILEY, C. V.] The eggs of the army-worm. <Colman's Rural World, 7 June, 1876. S.-b. No. 10, p. 170. Reprint: <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 211 Proc. <Amer. Nat., August, 1876, v. 10, pp. 508-509.

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- 1485. R[ILEY], C. V. Persian insect powder. <N. Y. Tribune, 7 June, 1876. S.-b. No. 10, p. 168.
  - Answer to letter of G. W. Holmes; impossibility of prescribing means against unknown insects; Paris green unsuitable for protection of bearing fruit trees; pyrethrum recommended.
- 1486. R[ILEY], C. V. Cocoons of silkworms. <N. Y. Tribune, 7 June, 1876. S.-b. No. 10, p. 168.
  - Answer to letter of A. R. Sprout; description of larva and cocoon of Callosamia [= Attacus] promethea; colors of imagos; food-plants of larvæ; deposition of eggs; silk of little value.
- 1487. [RILEY, C. V.] Is Paris green absorbed? <N. Y. Tribune, 7 June, 1876. S.-b. No. 10, pp. 168–169.
  - Answer to letter of M. F.; plants colored by certain tinctures placed at their roots; Paris green not absorbed into the tissues of plants in perceptible quantities, but neutralized in the soil.
- 1488. RILEY, C. V. Ditching for young locusts. < Colman's Rural World, 14 June, 1876. S.-b. No. 10, pp. 171-172; 203-204; 204-205.
  - Critical review of J. Stayman's article on same subject; proper width and depth of ditches to check the march of unfledged Caloptenus spretus and other locusts.
- 1489. RILEY, C. V. Periodical Cicada, "17-year locust." <N. Y. Semi-weekly Tribune, 23 June, 1876, 3 figs. S.-b. No. 10, pp. 166–167.
  - Occurrence of Cicada [= Tibicen] septendecim at Lexington, Va., in 1876; list of localities at which these insects will appear this year; chronological history of a brood; figures of larva, pupe, and imago.
- 1490. RILEY, C. V. Specific for Colorado potato-beetle. < Colman's Rural World, 28 June, 1876. S.-b. No. 10, p. 160. Reprint, with omissions: < N. Y. Tribune. S.-b. No. 14, p. 7.
  - Answer to letter of R. Barbour; directions for the use of Paris\*green as a means against *Doryphora decemlineata*.
- 1491. RILEY, C. V. [Inquiries concerning the Colorado potato-beetle, and Mayor Brown's answer thereto.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 170–172 Proc.
  - Verbal communication; critical review of answer of Mayor Brown to inquiries of A. C. Hardy de Boislieu as to the means of preventing the introduction of Doryphora decemtineata into Belgium; quotes the 6th Ann. Rept. State Ent. Mo., p. 16, showing that the fear of such introduction is not unfounded; inaccuracy of Mayor Brown's opinions; manner in which Doryphora decemlineata will probably reach Europe if at all.
- 1492. RILEY, C. V. [On the ravages of young locusts in western Missouri.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 179–180 Proc.
  - Verbal communication; alarming nature of the ravages of unfledged Caloptenus spretus in western counties of Missouri at the present time; probable future departure of the winged locusts: means to be adopted against the locusts now.

- 1493. RILEY, C. V. [Lecture on the Rocky Mountain locust.] < Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 180 Proc.
  - Brief abstract of lecture; prediction of the speedily approaching end of the ravages of *Caloptenus spretus* in Missouri for 1875; plentiful crops to be expected subsequently.
- 1494. RILEY, C. V. [Predictions verified.] < Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 185 Proc.
  - Verbal communication; accuracy of author's conclusions as to the probable doings of Caloptenus spretus in Missouri later in the season.
- 1495. RILEY, C. V. [On changes in vegetation caused by locusts.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 188–189 Proc. See: <Amer. Nat., February, 1876, v. 10, p. 125.
  - Verbal communication; remarks on the extraordinary development of Vilfa vaginæflora for a season after the ravages of Caloptenus spretus have occurred an illustration of "the struggle for existence;" the interesting character of such instances of abnormal multiplication of a species; criticism and defense of the expressions "struggle for existence" and "natural selection."
- 1496. RILEY, C. V. Jumping seeds and galls. <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 190-192 Proc. Reprint: <Gardener's Mo. and Hortic., July, 1878, v. 20, pp. 213-214. See: <Amer. Nat., February, 1876, v. 10, p. 125. Pacific Rural Press, 6 April, 1878.
  - Description of the seeds (of an unknown plant) which are inhabited by the larvæ of Carpocapsa saltitans; manner in which these larvæ cause the seeds to roll and jump; habits of larva within the seed; description of the plant bearing the seeds; the seed of Tamariscus moved by the larva of Nanodes tamarisci, which feeds within it; description of the gall of Cynips [= Neuroterus] quercus-saltatorius and of the jumping of these galls.
- 1497. RILEY, C. V. [On the use of Paris green as an insecticide.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 193. See: <Amer. Nat., February, 1876, v. 10, p. 126.
  - Verbal communication; confirmation, by experiments of R. C. Kedzie, of author's conclusions in regard to the safety of Paris green as an insecticide; this substance metamorphosed into a less soluble form in the ground and held in the ground if not used to excess; when applied in small but sufficient quantities not injurious to plants; objections to the use of the "Potato-pest poison" made at the Lodi [N. J.] Chemical Works.
- 1498. RILEY, C. V. New use for the American Agave. <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 195-196 Proc. See: <Amer. Nat., February, 1876, v. 10, p. 126.
  - Verbal communication; use of the dried flower-stalk of Agave americanus for lining insect-boxes.
- 1499. RILEY, C. V. [Food of insectivorous plants.] < Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 201-202 Proc.
  - Drosera, Diona and other plants digest, absorb, and appropriate nitrogenous matters; glands for the appropriation of animal food not yet found in the Sarracenias.
- 1500. RILEY, C. V. Parasites on bees. <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 212 Proc.
  - Bees in California infested with triungulins of a Meloë sp. which sometimes kill the bees; usual habits of such triungulins.

- 1501. RILEY, C. V. The locust pest. <Sci. Amer., 1 July, 1876 [v. 49], n. s., v. 35, p. 9.
  - Effects of water and cold on the eggs of Caloptenus spretus.
- 1502. RILEY, C. V. Swallows; bed bugs. <Colman's Rural World, 5 July, 1876. S.-b. No. 10, p. 166.
  - Answer to letter of R. R. Pierce; nests of *Hirundo fulva* generally infested by *Acanthia lectularia*; those of *Hirundo americana* rarely so; while this habit might cause annoyance about a dwelling, it is of little consequence when the bird nests under the eaves of a church.
- 1503. [RILEY, C. V.] Berry and cherry twigs. ' <N. Y. Tribune, 5 July, 1876. S. b. No. 10, p. 169.
  - Answer to letter of W. Keyser; eggs of *Ecanthus niveus* laid in twigs of *Rubus* and *Prunus*; description, habits of, and means against *Oberea tripunetata*.
- 1504. R[ILEY], C. V. Three worms and their work. <N. Y. Weekly Tribune, 12 July, 1876, 2 figs. S.-b. No. 14, p. 132.
  - Answer to letter of "Subscriber;" means against larve of Agrotidae, of Elateridae, and earth worms, Lumbricus sp.; eggs of Agrotis ypsilon laid in the spring; breeding-habits and economic importance of Lumbricus; figures of an elatrid larva and imago.
- 1505. [RILEY, C. V.] Mite parasites of the Colorado potato-beetle. <Mirror and Farmer, 15 July, 1876, v. 28, No. 29, p. 2. S.-b. No. 14, p. 221. Reprint: <Gardener's Mo. and Hortic., September, 1876, v. 18, p. 279. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 219 Proc. Note: <Amer. Nat., October, 1876, v. 10, p. 636.
  - Ectoparasitism of a gamasid mite [Uropoda americana] on Doryphora decemlineata; list of vertibrate enemies of D. decemlineata.
  - The reprints note the occurrence of *D. decemlineata* in New Hampshire and its ravages along the Atlantic coast. See No. 1610.
- 1506. [RILEY, C. V.] [Wheat insects.] <Blair [Nebr.] Times, 20 July, 1876. S.-b. No. 10, pp. 200-201.
  - Quotes from 1st Ann. Rept. State Ent. Mo., pp. 159-161; wheat injured in Nebraska in 1876 by Cecidomyia destructor and Meromyza americana; ravages of larva, description of imago and means against the latter; occurrence of Disonycha flaviventris in Nebraska.
- 1507. RILEY, C. V. A new enemy of wheat. <N. Y. Tribune, 21 July, 1876. S.-b. No. 14, pp. 129-130; 130-131.
  - Answer to letter of W. Robson; occurrence, habits, and ravages of *Leucania albilinea* in Maryland, Pennsylvania, and Kansas; history and description of larva, pupa, and imago of the insect; evolution of new habits and forms among insects.
- 1508. [Riley, C. V.] Chinch-bug; bee-moth. <Colman's Rural World, 26 July, 1876. S.-b. No. 10, pp. 201–205.
  - Answer to letter of G. R. Christian; means against Blissus leucopterus and Galleria cereana; food, seasons, habits, and description of the latter.
- 1509. RILEY, C. V. The grape-root borer, *Ægeria polistiformis*. <Colman's Rural World, 26 July, 1876, 2 figs. S.-b. No. 10, pp. 205–206.
  - Answer to letter of F. J. Kron; experiments on means against Ægeria [= Sciapteron] polistiformis; habits of larva; figures of imago; geographical distribution.

- 1510. RILEY, C. V. Sweet-potato beetles; "beautiful bugs." <N. Y. Weekly Tribune, 26 July, 1876, 3 figs. S.-b. No. 10, p. 213.
  - Answer to letter of W. Snowden; characters and habits of Cassididæ; description and figures of larvæ and imagos of Coptocycla [=Cassida] bivittata and C. [= C.] nigripes; descriptions of C. aurichalcea and C. guttata; these species feed on leaves of Ipomæa batatas and C. aurichalcea, also on leaves of Convolvulus and of Solanum dulcamara; means against them.
- 1511. [RILEY, C. V.] Those centennial insects. <N. Y. Weekly Tribune, 26 July, 1876. S.-b. No. 10, p. 219.
  - Criticism of communication of L. A. M.; list of principal insects preying upon stored corn.
- 1512. R[ILEY], C. V. Wheat midge; "rue-worms." < N. Y. Tribune, 2 August, 1876. S.-b. No. 10, p. 202.
  - Larvæ of Papilio asterias feeding on Ruta graveolens; description, habits, seasons, ravages of, and means against Cecidomyia [= Diplosis] tritici.
- 1513. RILEY, C. V. Apple and peach borers. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, pp. 3-4; 55-56. Extract: <Cultivator and Country Gentleman, 7 September, 1876, v. 41, p. 566. Answer to inquiries of F. H.; Chrysobothris femorata distinguished from Sa
  - perda bivittata [= candida] and Egeria [= Sannina] exitiosa; habits and description of the first; habits of the last and means against both.
- 1514. RILEY, C. V. Large saw-fly. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 4.
  - Answer to inquiry of J. B. J.; description of larva and image of Cimbex laportei [= americana]; its food-plants and transformations.
- 1515. RILEY, C. V. Cottony scale-insect on maples. < Colman's Rural World, 9 August, 1876. S.-b. No. 14, pp. 4-5.
  - Answer to inquiry of C. F. Mills; Lecanium acericola [= Pulvinaria innumerabilis] injurious to Acer dasycarpum at Springfield, Ill.; habits, description of the scale, and manner of oviposition; no great injury ever done by insects of this genus.
- 1516. RILEY, C.V. Hickory vs. locust borer. < Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 5.
  - Answer to inquiry of F. M. D.; description of larva and image and natural history of Arhopalus [= Cyllene] pictus; characters distinguishing this from A. [= C.] robiniæ; food-plants and seasons of the latter.
- 1517. RILEY, C. V. Stag-beetle. < Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 5.
  - Answer to inquiry of S. Lee; occurrence and characters of Lucanus elaphus; food of larva.
- 1518. RILEY, C. V. Eggs of the angular-winged katydid. \* < Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 5.
  - Answer to inquiry of V. Kriegel; descriptions of eggs, imagos, and song of *Microcentrum retinerve*; habits and ravages and means against the same.
- 1519. RILEY, C. V. Experience with the Colorado potato-beetle. < Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 6.
  - Letter from N. Coleman; larvæ of Doryphora decembineata in confinement pupated on the surface of the ground; imagos cat the tubers underground.

- 1520. [RILEY, C. V.] An elm enemy. <N. Y. Semi-weekly Tribune, 11

  August, 1876. S.-b. No. 14, pp. 54-55.
  - Habits and ravages of and means against Galernea calmariensis [= xanthomc-lena].
- 1521. RILEY, C. V. The locust in 1876. <N. Y. Weekly Tribune, 16 August, 1876. S.-b. No. 14, p. 73.
  - The ocenrence and ravages of Caloptenus spretus in Minnesota and Colorado in 1876; their absence from other portions of the country oceasionally inhabited by them; their destruction by Astoma gryllaria [= Trombidium locustarum] and inability to maintain themselves in parts of the region they infest.
- 1522. [RILEY, C. V.] The war on "corn-worms." <N. Y. Semi-weekly Tribune, 18 August, 1876. S.-b. No. 14, p. 73.

  Review of article by A. Brewster; ravages of and means against larvæ of Elateridæ, Agrotididæ and Lachnosterna quercina [=fusca] and the "grubworm," injurious to growing maize.
- 1523. RILEY, C. V. Spined soldier-bug. <Ohio Farmer, 19 August, 1876, v. 50, p. 118.
- 1524. RILEY, C. V. "Potato-pest poison." <Sci. Amer., 19 August, 1876 [v. 49], n. s., v. 35, p. 116.
  Condemning some of the patent poisons for Doryphora decemlineata.
- 1525. RILEY, C. F. Cottonwood borers. <N. Y. Weekly Tribune, 23
  August, 1876. S.-b. No. 14, p. 55.

  Answer to inquiry of J. R.; food-plants and ravages of and means against Plectrodera scalator.
- 1526. RILEY, C. V. Harmless insects. <N. Y. Weekly Tribune, 23° August, 1876. S.-b. No. 14, p. 55.

  Answer to letter of a "Subscriber;" occurrence of *Psoeus venosus* on appletrees; habits and molting.
- 1527. RILEY, C. V. Locust prospects. <N. Y. Tribune, 6 September, 1876. S.-b. No. 10, pp. 213-215; No. 14, pp. 74-75. Reprint: <Prairie Farmer, 16 September, 1876, v. 47, p. 298. S.-b. No. 10, pp. 207-209.
  - Answer to letter of G. H. H.; movements and ravages of Caloptenus spretus in Aug., 1876, in Dakota, Minnesota, Iowa, Nebraska, and Colorado.
- 1528. RILEY, C. V. Some notes on potato-beetles. <Sci. Amer., 9
  September, 1876 [v. 49], n. s., v. 35, p. 164. Reprint: <Ohio
  Farmer, 16 September, 1876, v. 50, p. 179. S.-b. No. 14, pp.
  6, 7.
  - Critical review of S. R. M.'s "Facts about potato-beetles;" Doryphora decemlineata flies in the day-time, but not at night; feeds upon several species of plants; hibernates as an imago, which should be destroyed in early spring.
- 1529. RILEY, C. V. Entomological works wanted. < Colman's Rural World, 20 September, 1876. S.-b. No. 14, p. 2.
  - Answer to letter of J. W. Newman; notice of some works on entomology for the use of students.

- 1530. [RILEY, C. V.] Grape-leaf Philloxera enemy. <Colman's Rural World, 20 September, 1876. S.-b. No. 14, p. 3.
  - Answer to letter of A. Engleman; Leucopis sp.? parasitic in galls of Phylloxera vastatrix and P. rileyi.
- 1531. [RILEY, C. V.] Grape-leaf gall. < Colman's Rural World, 20 September, 1876. S.-b. No. 14, p. 3.
  - Answer to letter of A. A. Briggs; *Phylloxera vastatrix* does comparatively little damage on the leaves of grape-vines; Clinton and Taylor vines peculiarly subject to the attacks of the leaf-inhabiting form; Concord vines seldom attacked by it and not seriously injured by the root-inhabiting form; means against the leaf-inhabiting form.
- 1532. RILEY, C. V. New locust theory wanted. <Colman's Rural World, 27 September, 1876. S.-b. No. 14, p. 62.
  - Answer to letter of W. T. D.; facts not theories wanted in regard to the flights of Caloptenus spretus.
- 1533. RILEY, C. V. Cecropia worm on elder. <Colman's Rural World, 27 September, 1876, 1 fig. S.-b. No. 14, p. 63.
  - Answer to letter of A. S. Van Winkle; description of larva, cocoon, and imago of Samia [= Attacus] cecropia; figure of larva; habits and seasons; availability of the eocoon for silk.
- 1534. RILEY, C. V. The harlequin cabbage-bug. <Colman's Rural World, 4 October, 1876. S. b. No. 14, p. 56.
  - Answer to letter of R. J. Waters; habits, ravages, distribution, and means against *Strachia* [= *Murgantia*] *histrionica*; colors of early stages and of imagos.
- 1535. [RILEY, C. V.] Butterfly chrysalis. <N. Y. Tribune, 13 October, 1876. S.-b. No. 19, p. 224. Reprint: <N. Y. Tribune, 21 October, 1876. S.-b. No. 10, p. 223.
  - Answer to inquiry of E. B. S.; occurrence of *Danais archippus* in swarms in central United States in autumn of 1876; colors of larva and pupa; larva feeds on *Asclepias*.
- 1536. [RILEY, C. V.] Domesticated katydid. <N. Y. Tribune, 18 October, 1876. S.-b. No. 19, p. 214. Reprint: <N. Y. Tribune, 21 October, 1876. S.-b. No. 10, p. 219.
  - Answer to letter of C. A. P.; longevity and food of Microcentrum retinerve.
- 1537. [RILEY, C. V.] Unjust accusation? <N. Y. Tribune, 21 October, 1876. S.-b. No. 10, p. 209; No. 19, p. 242.
  - Answer to inquiry of a "Correspondent;" Harpalus erraticus accused of destroying shrubbery; predaceous habits of Carabida.
- 1538. RILEY, C. V. -The Rocky Mountain locust. < Colman's Rural World, 1876, v. —, 30 October, 6 November, 13 November. S.-b. No. 10, pp. 185–188. See: < Kansas Farmer, November, 1876. S.-b. No. 10, pp. 225–235. < N. Y. Tribune, October, 1876. S.-b. No. 10, p. 215.
  - Verification of predictions in regard to the limitation of the ravages of Caloptenus spretus in western Missouri in 1876; gathering eggs, ditching, rolling, and burning recommended as means against them; recommends the employment of soldiers, of hogs, and of poultry, late planting, and the destruction of the locusts in their native country; Blissus leucopterus more

- 1538. RILEY, C. V.—Continued.
  - injurious in Western Missouri in 1876 than Caloptenus spretus; prospect of freedom from injury by the former for the next two years; Vilfa vaginæflora introduced into the castern prairies by the locusts; limit to the eastern range of the locusts; they are not led by kings or queens; occurrence of larvæ of Deilephila lineata after the disappearance of the locusts; locust flights in Illinois.
- 1539. [RILEY, C. V.] Canker-worms at the West. <N. Y. Tribune, 31 October, 1876. S.-b. No. 17, p. 59.
  - Occurrence of *Paleacrita vernata* in Michigan in 1872 and in Ohio in 1874, 1875, and 1876; brief account of *P. vernata* and *Anisopteryx pometaria*; their habits, ravages, and means against them.
- 1540. RILEY, C. V. [The venation of Anisopteryx and variation in imagos.] <Ca. Ent., September [October], 1876, v. 8, pp. 178–179.
  - Variation in the venation of the wings of Anisopteryx pometaria and in the imagos of so-called species.
- 1541. RILEY, C. V. A new enemy of the grasshopper. <Lawrence [Kans.] Journal. Reprint: <Industrialist [Manhattan, Kans.], 2 November, 1876, v. 2, No. 30, p. 2. S.-b. No. 10, pp. 209-210. Letter of F. H. Snow with comments; eggs of Caloptenus spretus destroyed
  - Letter of F. H. Snow with comments; eggs of Caloptenus spretus destroyed by larvæ of Anthomyia.calopteni [=angustifrons]; characters of the larvæ; eggs destroyed by larvæ of some Ichneumon? [=Systæchus oreas]; need of destroying eggs by artificial means.
- 1542. RILEY, C. V. Silk culture in Kansas. <a href="Nationalist">Nationalist</a>, 10 November, 1876. S.-b. No. 14, p. 1.
  - Importance of silk culture; practicability of the culture and prospects of its increase in the United States; measures for its promotion in Kansas; successful raising of silkworms on osage orange [Maclura aurantiaca].
- 1543. RILEY, C. V. Bee killers: Asilus flies. <N. Y. Weekly Sun, 15 November, 1876. S.-b. No. 10, p. 201.
  - Habits of Asilidae, especially of Trupanea [= Promachus] apirora and Asilus missouriensis [= Proctacanthus milberti]; description of T. [= P.] apirora; larva of Asilus scriceus feeds on roots of Rheum rhaponticum.
- 1544. RILEY, C. V. How to use Paris green for the cotton-worm. <Colman's Rural World, 15 November, 1876. S.-b. No. 10, pp. 210–211. See: <N. Y. Tribune, 15 December, 1876. S.-b. No. 14, p. 7.
  - Answer to letter of C. W. Niver; directions for the use of Paris green by the dry and wet method; description of sprinkling machines.
- 1545. [RILEY, C. V.] Notodonta concinna. <Colman's Rural World, 15 November, 1876. S.-b. No. 10, p. 219.
  - Answer to letter of J. Barritt; description of larva of Notodonta [= Œdema-sia] eoncinna; habits, food-plants, and means against the same.
- 1546. [RILEY, C. V.] The dog-day harvest fly. <Colman's Rural World, 15 November, 1876. S.-b. No. 10, p. 220.
  - Answer to inquiry of C. A. U.; description of Cicada pruinosa [= tibicen]; method of sonifaction; habits; notice of some manuals of entomology.

- 1547. [RILEY, C. V.] Snake-worms. < Colman's Rural World, 15 November, 1876. S.-b. No. p. 10, p. 220.
  - Answer to letter of J. Armstrong; description of larvæ of Sciara sp.; their habit of moving in congregations; their abode and enemies.
- 1548. RILEY, C. V. Locust eggs. < Colman's Rural World, 15 November, 1876. S.-b. No. 10, p. 223.
  - Answer to letter of C. T.; female Acridida lay more than one litter of eggs; the occurrence of egg-like parasites in males has led to the supposition that the males bore eggs.
- 1549. RILEY, C. V. Locust flights east of the Mississippi. <Colman's Rural World, 22 November, 1876. S.-b. No. 10, pp. 211–212; 221–222; 223–225. Reprint: <Sci. Amer., 16 December, 1876 [v. 49], n. s., v. 35, p. 392, 2 figs. S.-b. No. 10, pp. 216, 217. <Trans. Kans. Acad. Sci., 1877, v. 5, pp. 62–64.
  - Limitation of plants and animals to certain geographical regions; regions in which alone Caloptenus spretus survives; species confounded with C. spretus; occurrence of swarms of Acridium americanum in Ohio; description, geographical distribution, and ravages of the same; swarms of Caloptenus differentialis, C. atlanis, and C. femur-rubrum in Illinois; ravages of the same. The reprint in the Sci. Amer. contains figures of Caloptenus spretus and Acridium americanum.
- 1550. RILEY, C. V. Locusts again. <N. Y. Tribune, 22 November, 1876. S.-b. No. 10, p. 222.
  - Effects of winter on the vitality of the cggs of Acridide.
- 1551. RILEY, C. V. The army-worm; its natural history complete-<Sci. Amer., 9 December, 1876 [v. 49], n. s., v. 35, p. 372, 4 figs. S.-b. No. 10, pp. 217-219. Reprint, with slight changes: <Proc. Amer. Assoc. Adv. Sci. for 1876, 1877, v. 25, pp. 279-283, 2 figs.
  - Geographical distribution of *Leucania unipuneta*; figures of all stages and of ovipositor of female; place and manner of oviposition; description of eggs and young larvæ; number of annual broods; summary of the natural history of this species.
- 1552. RILEY, C. V. The apple-bark louse. <Ca. Farmer, 15 December, 1876. S. b. No. 14, p. 50.
  - Seasons, habits, and ravages of Mytilaspis pomicorticis [=pomorum]; description of young larvæ; of males and females and formation of scales.
- 1553. RILEY, C. V. The apple maggot; a formidable enemy. <N. Y. Semi-weekly Tribune, 15 December, 1876. S.-b. No. 14, pp. 7–8.
  - Answer to letter of P. M. Augur; description of larva and image of *Trypeta pomonella*; ravages, food-plants, habits, and means against the same; literature of the subject.
- 1554. RILEY, C. V. Entomological notes; confounding friend with foe. <a href="#"><Colman's Rural World, 20 December, 1876.</a> S.-b. No. 14, p. 4.
  - Description of scales and eggs of Diaspis harrisii [= Chionaspis furfurus] and of colors of larva, pupa, and image of Chilocorus bivulnerus; ravages of the Diaspis; habits and usefulness of the Chilocorus.

- 1555. RILEY, C. V. Locust injury next spring. The territory in Missouri that will probably suffer therefrom. <Colman's Rural World, 20 December, 1876. S.-b. No. 14, pp. 5-6. Reprint: <Industrialist [Manhattan, Kans.], 17 February, 1877, v. 2, No. 44, p. 4. S.-b. No. 14, p. 49.
  - Prediction of ravages of Caloptenus spretus to occur in spring of 1877 in Missouri.
- 1556. [RILEY, C. V.] Amputating insects. <N. Y. Semi-weekly Tribune, 29 December, 1876, 2 figs. S.-b. No. 14, pp. 8-9.
  - Description of the work of Elaphidion putator [= villosum] and Oncideres cingulata; habits of both; figures of larva, pupa, and image of the latter; similarity in habits of Oncideres amputator and E. putator to those of O. cingulata.
- 1557. [RILEY, C. V., et al.] The Rocky Mountain locust or grasshopper, being the report of proceedings of a conference of the Governors of several Western States and Territories, together with several other gentlemen, held at Omaha, Nebr., on the 25th and 26th days of October, 1876, to consider the locust problem; also a summary of the best means now known for counteracting the evil. <St. Louis, 1876, 8°, pp. 3+58, 8 figs. See: <N. Y. Tribune, 1876. S.-b. No. 10, p. 223.
  - Preface, proceedings, pp. 1-36. Practical considerations and suggestions for the suppression of *Caloptenus spretus*; description, oviposition, transformations, and habits of the same; its enemies and parasites; means against it; description of *Anthomyia calopteni* n. sp. [= angustifrons]. Figures. Prepared by J. S. Pillsbury, P. Pusey, and C. V. Riley.
- 1558. RILEY, C. V. Potato pests. Being an illustrated account of the Colorado potato-beetle and the other insect foes of the potato in North America, with suggestions for their repression and methods for their destruction. <New York: Orange Judd Company [1876], pp. 108, 49 figs., map. Review: <Cultivator and Country Gentl., 11 January, 1877, v. 42, p. 25. Reply to review: <1bid., 1 February, 1877, v. 42, p. 78. S.-b. No. 14, pp. 56-57.

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pædia, 1876, v. 2, pp. 412-416, 16 figs. S.-b. No. 10, pp. 76-80. Definition of the term "gall-insects"; classification and habits of the same; mention by name and figures of typical species and galls made by them; dimorphism and metagenesis of Cynips.

1560. RILEY, C. V. Gall-nuts. < Johnson's New Universal Cyclopædia, 1876, v. 2, p. 417, 1 fig. S.-b. No. 10, p. 81.

Definition of "gall-nuts" formed by Cynips gallæ-tinctoriæ on twigs of Quercus infectoria; local origin, chemical composition, use in the arts.

- 1561. RILEY, C. V. Galls. < Johnson's New Universal Cyclopædia, 1876, v. 2, pp. 418-419, 2 figs. S.-b. No. 10, pp. 82-83. Definition of "galls;" their variety of form, texture, and location; their nature and source.
- 1562. RILEY, C. V. Locust prospects. < Colman's Rural World, 3 January, 1877. S.-b. No. 14, pp. 57-58; 58-59. Explains means of prognosticating the advent of Caloptenus spretus in the

spring of 1877; recommends measures of precaution and the procurement of information concerning means against these insects, and gives assurance that the invasion of the locusts will be but temporary.

- 1563. RILEY, C. V. Bots. <Sci. Amer., 6 January, 1877 [v. 50], n. s., v. 36, pp. 9-10. Reprint: —S.-b. No. 14, pp. 235-236. <Lancaster Farmer, 15 September, 1877, v. 9, p. 142. S.-b. No. 14, p. 129. <Colman's Rural World. S.-b. No. 14, p. 100.
  - Habits, ravages, and means against Gastrophilus equi, Cephalomyia [= Œstrus] ovis, and Hypoderma bovis.
- 1564. [RILEY, C. V.] Academy of Science. Brilliant and profound address of Prof. C. V. Riley. The splendid record of the Academy for the past year. Reports of officers and committees and election of managers for the ensuing year. <St. Louis Times, 16 January, 1877, v. —. S.-b. 14, pp. 91-96. Reprint: <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 238-254 Proc. Separate: <St. Louis, 1877, 16 pp. Translation: <Anzeiger des Westerns, 16 January, 1877, v. 43, p. 3. S.-b. No. 14, pp. 50-54.

Review of progress made in science in North America, and especially by the Academy of Science of St. Louis in 1876; remarks on entomological observations and publications, and especially on *Doryphora decemlineata*, *Phylloxera vastatrix*, and *Caloptenus spretus*.

- 1565. RILEY, C. V. Is this a grasshopper year? Prof. Riley's opinion concerning the prospect for bugs. It all depends on the kind of weather we have during February. <St. Louis Daily Globe Democrat, 7 February, 1877, v. 2, No. 263, p. 3. S.-b. No. 14, pp. 69–70. Reprint: <Industrialist [Manhattan, Kans.] 17 February, 1877, v. 2, pp. 1, 4. S.-b. No. 14, p. 49. See: <Colman's Rural World, 1877. S.-b. No. 1, pp. 59–60.
  - Replies to questions as to the likelihood of the hatching of eggs of Caloptenus spretus in the spring of 1877; the degree of development attained before winter; possibility of the resumption of development after it has once been arrested.
- 1566. [RILEY, C. V.] Are the locusts hatching? Mistaken identity. < Colman's Rural World, 14 February, 1877, 2 figs. S.-b. No. 14, p. 62.
  - Modified extract.from 8th Ann. Rept. State Ent. Mo., May, 1876, pp. 149-150, Tragocephala [=Chortophaga] viridifasciata and Tettix granulatus mistaken for Caloptenus spretus; geographical distribution of the first; hibernation and colors of the two former; figures of both.
- 1567. RILEY, C. V. Condition of locust eggs: Inquiries answered. <Colman's Rural World, 21 February, 1877. S.-b. No. 14, pp. 67-68; 68.
  - Replies to inquiries as to the degrees of development attained by eggs of Caloptenus spretus submitted for examination.
- 1568. RILEY, C. V. Tarred paper for fruit trees. <Colman's Rural World, 7 March, 1877. S.-b. No. 14, p. 61.
  - Critical review of article by E. Gaylord; the inclosure of trunks of fruit trees in tarred paper serviceable as a protection from the sun, rabbits, mice, and borers.
- 1569. RILEY, C. V. Insect on the grape. <Gardener's Mo. and Hortic., March, 1877, v. 19, p. 90.
  - Varieties of grape attacked by Desmia maculalis; means against the same.
- 1570. RILEY, C. V. Ninth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <12th Ann. Rept. State Board of Agric. for 1876, March, 1877, pp. 7+129+3, 33 figs. Separate: <Jefferson City, Mo., March, 1877, pp. 7+129+3, 33 figs.

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- 1571. RILEY, C. V. Important observations on the Rocky Mountain locust or grasshopper pest of the West. <Sci. Amer., 28 April, 1877 [v. 50], n. s., v. 36, pp. 260–261, 5 figs.
  - Observations on the egg-laying habits of Caloptenus spretus; figures egg, egg-masses, method of oviposition, and female anal characters.
- 1572. RILEY, C. V. Experiments with locust eggs and conclusions therefrom. <Sci. Amer., 5 May, 1877 [v. 50], n. s., v. 36, pp. 276-277. S.-b. No. 14, p. 101.
  - Experiments upon the vitality of eggs of Caloptenus spretus; effects of alternately freezing and thawing, of exposure to great moisture or to the free air, and of burying them at different depths.
- 1573. RILEY, C. V. Prof. Riley's report to the Governor of Kansas: The grasshopper question: Interesting information. <Commonwealth [Topeka, Kans.], 12 May, 1877, No. 2500, p. 2. S.-b. No. 14, pp. 63-67. Reprint: <St. Louis Daily Globe-Democrat, 14 May, 1877, v. 2, No. 359, p. 3. S.-b. No. 14, pp. 70-72.. Notice: <Ibid., p. 4. S.-b. No. 14, p. 70. See: <Kansas Farmer, 16 May, 1877. S.-b. No. 14, p. 59.
  - Reply to letter of Governor G. T. Anthony; area within Kansas in which eggs of Caloptenus spretus were laid in 1876; the degree to which the young from these eggs had perished or were likely to commit ravages in the summer of 1877; causes of the destruction of a great proportion of the young locusts; means of completing this destruction.
- 1574. RILEY, C. V. The strawberry leaf-roller, Anchylopera fragariæ. <a href="#"><Gardener's Mo. and Hortic.</a>, May, 1877, v. 19, pp. 143–144, fig. S.-b. No. 14, p. 45.
  - Reprint, with additional introduction and note, from 1st Ann. Rept. . State Ent. Mo., March, 1869, pp. 142-143, fig. 80. See No. 1059 for synopsis of contents.

- 1575. [RILEY, C. V., et al.] U. S. Entomological Commission. Circular No. 1. [Riley, Packard, Thomas.] < Washington: 1877, 8°, 4 pp.
  - Queries regarding the migrations, appearances, habits, and ravages of Caloptenus spretus; directions for making replies.
- 1576. RILEY, C. V. U. S. Entomological Commission. Circular No. 2. <Washington: 1877, 8°, 4 pp.
  - Plans of work; request for information regarding the natural history, insect enemies, and parasites of *Caloptenus spretus* and other locusts; means against the same.
- 1577. [RILEY, C. V., et al.] Bulletin of the United States Entomological Commission. Destruction of the young or unfledged locusts. No. 1. [Riley, Packard, Thomas.] < Washington: 1877, 8°, 12 pp. See: <Sci. Amer., 2 June, 1877 [v. 50], n. s., v. 26, p. 344.
  - Enumeration of means of destroying young or unfledged locusts; quotations of laws passed by States of Missouri, Kansas, and Minnesota to provide for the destruction of locusts and their eggs.
  - Supplement to Bulletin No. 1, 2 pp. Summary of means for the destruction of young locusts.
- 1578. [RILEY, C. V., et al.] Bulletin of the United States Entomological Commission. On the natural history of the Rocky Mountain locust, and on the habits of the young or unfledged insects as they occur in the more fertile country in which they will hatch the present year. No. 2. [Riley, Packard, Thomas.] < Washington: May, 1877, 8°, 15 pp., figs. 1-11, map.
  - Description, oviposition, hatching, transformations, and habits of *Caloptenus spretus*; map of the country that will suffer most severely, showing the eastern limit of injury the present year.
- 1579. RILEY, C. V. The grape leaf-folder. <Journ. and Farmer, 14

  June, 1877. S.-b. No. 14, p. 133.
  - Description of larva, imago, habits, ravages, distribution, seasons, and foodplants of Desmia maculalis.
- 1580. RILEY, C. V. The rascal leaf-crumpler. <Journ. and Farmer, 14 June, 1877. S.-b. No. 14, pp. 133-134.
  - Description of larva, larva-case, imago, habits, ravages of, distribution, seasons, food-plants, and means against *Phycita nebulo* [= Acrobasis indiginella].
- 1581. RILEY, C. V. The Hessian-fly. <Journ. and Farmer, 14 June, 1877. S.-b. No. 14, p. 135.
  - Description of eggs, larva, puparium, and imago of Cecidomyia destructor; civil history, seasons, habits, ravages of and means against it; habits of Semiotellus [= Merisus] destructor.
- 1582. RILEY, C. V. Locust prospects. <Sci. Amer., 16 June, 1877, [v. 50], n. s., v. 36, p. 369.
  - Causes of the destruction of a great proportion of the young of *Caloptenus* spretus; a general and disastrous invasion improbable for some years.
- 1583. [RILEY, C. V.] Insect enemies. <N. Y. Tribune, 16 June, 1877. S.-b. No. 14, pp. 234–235.
  - 1. Apple-borers; answer to letter of V. B. P.; young apple-trees killed by Xyleborus obesus.

- 1583. RILEY, C. V.—Continued.
  - 2. Rose-chafer; answer to letter of I. M. H.; means against Macrodactylus subspinosus.
  - 3. Bark-louse; answer to letter of J. L. K.; seasons and ravages of and means against Mytilaspis pomicorticis [= pomorum].
  - 4. Flea-beetle; answer to letter of J. E. R.; habits, ravages, and means against Graptodera [= Haltica] chalybea.
- 1584. RILEY, C. V. The Hellgrammite. <Sci. Amer., 23 June, 1873 [v. 50], n. s., v. 36, pp. 392–393, 3 figs.
  - Structure and habits of *Corydalus cornutus*, description and figures of eggmasses, eggs, larvæ, pupa, and imagos; adaptations of sexual structure to conditions; figure and description of eggs of *Belostomå grande* [=americanum].
- 1585. RILEY, C. V. The 'hopper in Iowa. Report by Professor Riley, Chief of the U. S. Entomological Commission. <Chicago Daily Tribune, 4 July, 1877, v. 32, p. 3. S.-b. No. 14, pp. 112–114. Extract: <N. Y. Tribune, 4 July, 1877. S.-b. No. 14, p. 128.
  - Report to the governor of Iowa as to the observed and anticipated ravages of Caloptenus spretus in southwestern Iowa in 1877; the young locusts mostly destroyed by the weather; their natural enemies and the efforts of man; localities infested; recommends diversification of crops; summary of means against the young locusts; claims for the first recommendation of proper ditching; description of apparatus for catching and killing locusts.
- 1586. RILEY, C. V. Strawberry worm and remedy. <N. Y. Tribune, 18 July, 1877. S.-b. No. 14, p. 231.
  - Description of egg, larva, and imago, habits of and means against Emphytus [= Harpiphorus] maculatus.
- 1587. RILEY, C. V. Fighting the Hessian-fly. <N. Y. Tribune, 18 July, 1877. S.-b. No. 14, pp. 232–233. Reprint: <Colman's Rural World, 5 December, 1877. S.-b. No. 14, pp. 268–269.
  - Habits, seasons, parasites, introduction, spread, and ravages of and means against Cecidomyia destructor; description of eggs and larva.
- 1588. RILEY, C. V. The grasshopper. Considered practically and scientifically with a retrospective and prospective glance at his history. <Daily Rocky Mountain News [Denver, Colo.], 1 August, 1877, v. 18, p. 4. S.-b. No. 14, pp. 81–84; 110–112. Reprint: <Colorado Farmer, 2 August, 1877, v. 9, No. 31, p. 4. <Chicago [Ill.] Daily Tribune, 7 August, 1877, v. 32, p. 7. S.-b. No. 14, pp. 84–86.
  - Observations on the past and present conditions of Caloptenus spretus in 1877 in the regions invaded by it; work of its enemies and parasites; complication of the locust problem in Colorado owing to the climate of the State; prospects of future injury; means against the locusts in Colorado; work of the U. S. Entomological Commission.
- 1589. RILEY, C. V. In reference to wheat-worms. <Prairie Farmer, 11 August, 1877. S.-b. No. 14, p. 127; No. 20, p. 86.
  - Critical review of C. Thomas' "A wheat insect" (Prairie Farmer, 21 July, 1877), with correction of some obscurities in regard to Meromyza americana and Gortyna nitela.

- 1590. RILEY, C. V. Locust flights. An appeal from Prof. C. V. Riley. <Manitoba Daily Free Press, 8 September, 1877. S.-b. No. 14, p. 91.
  - Reprint of questions of Circular No. 1 of U.S. Entomological Commission, with request for answers and other information from observers in Manitoba.
- 1591. RILEY, C. V. The locusts in Kansas. <Sci. Amer., 8 September, 1877 [v. 51], n. s., v. 37, p. 164.
  - No danger of locust invasion in Kansas and adjacent States in the fall of 1877; diseased conditions of late swarms; seasons of drought and locust swarms generally followed by rainy seasons and a scarcity of locusts.
- 1592. RILEY, C. V. A satisfactory grasshopper-machine. <Sci. Amer., 8 September, 1877 [v. 51], n. s., v. 37, p. 169.

  Description and figure of a machine for the killing of locusts.
- 1593. [RILEY, C. V.] Mistaken identity. <N. Y. Tribune, 12 September, 1877. S.-b. No. 14, p. 233.
  - Answer to letter of Subscriber; Lema trilineata mistaken for Doryphora 10-lineata; first occurrence of the latter in Vermont in 1876.
- 1594. RILEY, C. V. Injured orchard. <N. Y. Tribune, 12 September, 1877. S.-b. No. 14, p. 233.
  - Answer to letter of G. W. T.; occurrence of numerous nests of *Formicidæ* about the roots of orchard trees; probability that the ants are harmless; means against ants.
- 1595. [RILEY, C. V.] The stalk-borer. <N. Y. Tribune, 12 September, 1877. S.-b. No. 14, p. 233.
  - Answer to letter of Wisc.; food-plants of Gortyna nitela; description of larva.
- 1596. RILEY, C. V. Locust prospects in southwest Missouri this fall. <Journ. and Farmer, 27 September, 1877. S.-b. No. 14, pp. 236-237.
  - Ravages of Caloptenus spretus in Missonri in 1876 and prospects of same in 1877; history of locust flights in 1877.
- 1597. RILEY, C. V. The Colorado potato-beetle in Europe. German thoroughness. <Sci. Amer., 29 September, 1877 [v. 51], n. s., v. 37, p. 198. S.-b. No. 14, pp. 123-124.
  - Occurrence of *Doryphora* 10-lineata at Bremen and at Mülheim, in Germany; thorough measures taken to eradicate the pests; economic value of the measures.
- 1598. [RILEY, C. V.] The cussed red-leg. <Chicago [Ill.] Times, 29 September, 1877. S.-b. No. 14, pp. 119–123. Reprint: <Mo. Rept. Kansas State Board of Agric., 1877, pp. 32–41. S.-b. No. 14, pp. 146–161. Abstract: <Amer. Nat., November, 1877, v. 11, pp. 663–673. <Ca. Nat. and Quart. Jour. Sci., December, 1877, v. 8, pp. 363–374.
  - Distinction between the terms locust and grasshopper; nature of varieties and species; distribution of Caloptenus spretus; laws governing its migrations and distribution; exemplification of these laws by records of flights during 1877; means against locusts; distinctions between Caloptenus spretus and C. femur-rubrum; habits and transformations of Astoma gryllaria (= the young of Trombidium sericeum [= locustarum]); habits of the latter.

- 1599. RILEY, C. V. [White-grub-fungus.] <N. Y. Weekly Tribune, 4 October, 1877. Notice: <Amer. Ent., June, 1880, [v. 3], n. s., v. 1, p. 140.
- 1600. RILEY, C. V. On the larval characters and habits of the blisterbeetles belonging to the genera Macrobasis Lec. and Epicauta Fabr.; with remarks on other species of the family Meloidæ. <Trans. Acad. Sci. St. Louis, 5-16 November, 1877, v. 3, pp. 544-562, figs. 35-39; figs. 1-12 of pl. 5 with 1 p. expl. of pl. Separate: <[St. Louis, Mo., 1877], pp. 1-19, figs. 35-39; figs. 1-12 of pl. 5 with 1 p. expl. of pl. Abstract: <Sci. Amer., 1877 [v. 51], n. s., v. 37; 1 December, p. 346; 15 December, p. 373; 404 il. S.-b. No. 14, pp. 272-275. <Ent. Mo. Mag., January, 1878, v. 14, pp. 169-175. Reprint, with changes and omissions: <Amer. Nat., 1878, v. 12; April [19 March], pp. 213-219, figs. 1-2; May [22 April], pp. 282-290, figs. 3-5, pl. 1 with 1 p. expl. of pl. Separate: <Boston: 1878, pp. 213-219; 282-290; pl. 1 with 1 p. expl. of pl.
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- 1601. RILEY, C. V. On a remarkable new genus in *Meloidæ* infesting mason-bee cells in the United States. <Trans. Acad. Sci. St. Louis, 16 November, 1877, v. 3, pp. 563–565, fig. 40; fig. 13 of pl. 5, with 1 p. expl. of pl. Separate: <[St. Louis, Mo., 1877], pp. 20–22, fig. 40; fig. 13 of pl. 5, with 1 p. expl. of pl. Abstract: <Amer. Nat., April [19 March], 1878, v. 12, pp. 218–219.
  - Description of imagos, ultimate stage of second larva, and coarctate larva of Hornia minutipennis, n. g. et n. sp., parasitic in cells of Anthophora sponsa [= abrupta]; figures & imago and coarctate larva of the same; illustrates the stages of degradation in tarsal claws of several genera of Meloidæ; synoptic table of the North American genera of Meloini.
- 1602. RILEY, C. V. Additional notes on Megathymus yucca. <Trans. Acad. Sci. St. Louis, 16 November, 1877, v. 3, pp. 566-568. Separate: <[St. Louis, Mo., 1877], pp. 23-25.
  - Supplementary to No. 1465; habits, seasons, and number of molts of the larva; description of larva in second and third stage and of variations in the imago; description of coloradensis n. var.; Egiale cofaqui a variety of Megathymus yuccæ; Erynnis alccæ bores in stems of Malva sylvestris in Europe; Elaphidion tectum and Scyphophorus yuccæ in stems of Yucca.
- 1603. RILEY, C. V. Further remarks on Pronuba yuccasella and on the pollination of Yucca. <Trans. Acad. Sci. St. Louis, 16 No-

- 1603. RILEY, C. V.—Continued.
  - vember, 1877, v. 3, pp. 568-573. Separate: <[St. Louis, Mo., 1877], pp. 25-30. Translation: <Stett. Ent. Zeit., 1878, Jahrg. 39, pp. 377-382.
  - Critical review of remarks on *Pronuba* by Chambers, Zeller, and Boll; *Hyponomeuta quinquepunctella* mistaken for *Pronuba yuccasella*; variations in the former; uniformity in the latter; behavior of *Pronuba* in flowers of *Yucca*; question of the method of fertilization of *Yucca*.
- 1604. RILEY, C. V. On the differences between Anisopteryx pometaria, Harr. and Anisopteryx ascularia W.-V., with remarks on the genus Paleacrita. <Trans. Acad. Sci. St. Louis, 16 November-20 December, 1877, v. 3, pp. 573-577. Separate: <[St. Louis, Mo., 1877], pp. 30-34.
  - Characters of Anisopteryx ascularia show that it is congeneric with A. pometaria; criticism of Packard's Monograph of Geometrida; structural characters separating Anisopteryx and Paleacrita.
- 1605. RILEY, C. V. Wheat rust and Hessian fly. <N. Y. Tribune, 19 December, 1877. S.-b. No. 14, p. 235.
  - Means against Puccinia graminis; P. graminis and Æcidium berberidis are alternate generations of one species.
- 1606. RILEY, C. V. A new oak-gall on acorn cups. <Trans. Acad. Sci. St. Louis, 20 December, 1877, v. 3, pp. 577-578.
  - Description of gall of Cynips quercus-glandulus n. sp. [p. 578] on cupules of all species of prinus group of Quercus; remarks on the allied structure of the galls of C. fecundatrix in Europe, and of C. quercus-frondosa; occurrence of galls of C. [=Amphibolips] quercus-prunus on cupules of acorns.
- 1607. [RILEY, C. V.] [Maggots in sauce.] <N. Y. Tribune, 26 December, 1877. S.-b. No. 14, p. 234.
  - Larvæ of *Drosophila* sp. in canned sauce; *D. nigricornis* common in similar substances.
- 1608. [RILEY, C. V.] [Round-headed apple-tree borer.] <N. Y. Tribune, 26 December, 1877. S.-b. No. 14, p. 234.

  Ravages of and means against Saperda bivittata [= candida].
- 1609. RILEY, C. V. Entomological notes. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 217-218 Proc. See: <Amer. Nat., October, 1876, v. 10, p. 635.
  - Generic resemblance of Carpocapsa saltitans to C. pomonella; correction of vernacular name of Cicada [= Tibicen] septendecim; occurrence of the same in Virginia in 1876; yearly development of C. [= T.] tredecim; Sericaria mori reared for five years on Maclura aurantiaca with increased vigor and healthfulness; Salix nigra stripped by larvæ of Vanessa antiopa; habits of the same.
- 1610. RILEY, C. V. Entomological notes. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 219 Proc. See: <Colman's Rural World, 1876. S.-b. No. 10, p. 165. <N. Y. Tribune, 1876. S.-b. No. 9, p. 215. <Amer. Nat., October, 1876, v. 10, p. 635.</li>
  - Occurrence and ravages of Leucania albilinea in Kansas; ectoparasitism of Uropoda americana on Doryphora decemlineata; list of vertebrate enemies of

- 1610. PILEY, C. V.—Continued.
  - D. decemlineata; occurrence of D. decemlineata in New Hampshire; its ravages along the Atlantic coast; see No. 1505.
- 1611. RILEY, C. V. Centennial insects. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 220-221 Proc.
  - List and characterization of insects observed injuring exhibits in the Centennial Exposition.
- 1612. RILEY, C. V. Parasites on eggs of Caloptenus spretus. < Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 226 Proc.
  - A large proportion of locust eggs throughout the country are being destroyed by parasites, predaceous insects, and other causes; precautions against threatened injury; discovery of four new enemies of locust eggs.
- 1613. RILEY, C. V. Locust flights east of the Mississippi. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 226-228 Proc. Locust swarms in Ohio, Illinois, Georgia, and South Carolinia not composed of Caloptenus spretus; causes which limit the castward flight of C. spretus.
- 1614. RILEY, C. V. Geographical range of species. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 230-233 Proc.
  - Range of species in our time affected only by the interposition of human influence; the limits of this range definitely established by classified knowledge, and impassable, except by man's assistance; Caloptenus spretus can not change its habits; the difference in the susceptibility of different species to change inexplicable.
- 1615. RILEY, C. V. [Anticipated locust injury next summer.] < Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 236 Proc.
  - Abundance and advanced state of development of eggs of Caloptenus spretus in the States invaded in 1876; probable abundance and ravages in 1877.
- 1616. RILEY, C. V. [Japanese mode of packing silk-worm eggs.] < Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 236 Proc.
  - Mode in which the eggs of Sericaria mori are packed in Japan for transportation.
- 1617. RILEY, C. V. Locust experience. <Trans. Acad. Sci. St. Louis, December, 1877. v. 3, p. 267 Proc. See: <Colman's Rural World, 1877. S.-b. No. 14, p. 265.
  - Northern limit of the permanent breeding-grounds of Caloptenus spretus; confirmation of views regarding laws governing locust invasions; discovery of a new law.
- 1618. RILEY, C. V. Mite transformations. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 267–268 Proc. See: <Colman's Rural World, 1877. S.-b. No. 14, p. 265.
  - Habits and transformations of Trombidium sericeum [= T. locustarum]; Astoma gryllaria an immature form of the same.
- 1619. RILEY, C. V. [Mygale hentzii and Pepsis formosa.] < Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 269 Proc.
  - The bite of Mygale hentzii not so deadly as is generally supposed; habits of Pepsis formosa in preying on the spider.

- 1620. RILEY, C. V. [Ravages of *Termes flavipes*.] < Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 269 Proc. Note to communication of R. D. Grant on some ravages of *Termes flavipes*.
  - 621. RILEY, C. V. On the ovinosition of Sanerda bivittata Say. < Tran
- 1621. RILEY, C. V. On the oviposition of Saperda bivittata Say. < Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 269–270 Proc. See: < Colman's Rural World, 28 November, 1877. S.-b. No. 20, p. 6.
  - Description of egg and manner of oviposition of Saperda bivittata [=candida].
- 1622. RILEY, C. V. On migratory butterflies. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 273-274 Proc. See: <Valley Naturalist, January, 1878, v. 1, p. 2.
  - Phenomena and causes of the migrations of butterflies, especially of *Danais* archippus.
- 1623. RILEY, C. V. [Phylloxera and grape-rot.] < Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 275 Proc. See: < Colman's Rural World, 28 November, 1877. S.-b. No. 14, p. 268.
  - Disagreement with views of A. J. Cook as to there being any connection between the work of *Phylloxera vastatrix* and the ordinary grape-rot.
- 1624. RILEY, C. V. The periodical Cicada. <Western Farmer's Almanac for 1878, 1877, p. 48. S.-b. No. 14, p. 138. Reprint: <Colman's Rural World, 28 November, 1877. S.-b. No. 14, pp. 265-266.
  - Regular periodicity of the appearance of Cicada [= Tibicen] septendecim and C. [= T.] tredccim; popular description and natural history of the same; chronology of twenty-two different broads, geographically classified.
- more particularly a treatise on the Rocky Mountain locust, or so-called grasshopper, as it occurs east of the Rocky Mountains, with practical recommendations for its destruction. < Chicago: Rand, McNally & Co., 1877, 236 pp., 3 pl., 42 figs. Extract: < Manitoba Standard, 1877. S.-b. No. 14, pp. 97-98. Notice: < Cultivator and Country Gentl., 30 August, 1877, v. 42, p. 557. < Gardener's Mo. and Hortic., October, 1877, v. 19, p. 317. < Ent. Mo. Mag., October, 1877, v. 14, p. 118.

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1626. RILEY, C. V. On an extensile penetrating organ in a gamasid mite. <Proc. Amer. Assoc. Adv. Sci. for 1876, 1877, v. 25, pp. 273–275, 1 fig. See: <Ca. Ent., September [October], 1876, v. 8, p. 180.

- 1626. RILEY, C. V.—Continued.
  - Habits and description of *Uropoda vegetans* and *U. americana* n. sp.; nature of the adhesive filament of these mites; structure of the supposed maxillary penetrating organ in *Uropoda*.
- 1627. RILEY, C. V. On the curious egg-mass of Corydalus cornutus, Linn., and on the eggs that have hitherto been referred to that species. <Proc. Amer. Assoc. Adv. Sci. for 1876, 1877, v. 25, pp. 275–279, 1 fig. Reprint: <9th Ann. Rept. State Ent. Mo., March, 1877, pp. 125–129, figs. 30–33. See: <Ca. Ent., October [November], 1876, v. 8, pp. 181–182. See No. 1570 for synopsis of contents.
- 1628. RILEY, C. V. Phylloxera and grape-rot. <N. Y. Tribune, January, 1878. S.-b. No. 19, pp. 193; 224. Reprint: <Colman's Rural World, 1878. S.-b. No. 14, pp. 266-267. Extract: <Gardener's Mo. and Hortic., July, 1879, v. 21, pp. 213-214. S.-b. No. 23, pp. 118; 143-145. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 237-238. See: <Gardener's Chronicle, 9 August, 1879. S.-b. No. 26, p. 15. See No. 1721 for synopsis of contents.</li>
- 1629. RILEY, C. V. Address by Prof. C. V. Riley, retiring, before the St. Louis Academy of Science. <St. Louis Republican, 8 January, 1878. S.-b. No. 14, p. 269. Reprint: <Trans. Acad. Sci. St. Louis, 1880, v. 4, pp. 1–6 Proc.
  - Review of progress made in science in 1876; success of the investigation into the Rocky Mountain locust scourge.
- 1630. RILEY, C. V. New facts about the round-head apple-tree borer. <N. Y. Weekly Tribune, 20 February, 1878. S.-b. No. 19, pp. 193–194. Reprint: <Colman's Rural World, 20 March, 1878. S.-b. No. 14, pp. 267–268. Reprint, with slight omission: <Ibid., 12 March, 1879. S.-b. No. 23, pp. 101–102. See: <Mirror and Farmer, 6 April, 1878. S.-b. No. 20, p. 3.
  - Description of egg and manner of oviposition of Saperda bivittata [= can-dida]; seasons of oviposition; means against the same.
- 1631. [RILEY, C. V.] Buggy beans. <N. Y. Tribune, 20 February, 1878. S.-b. No. 14, p. 234.

  Habita and distribution of and means against Revelue falor; adibility of the
  - Habits and distribution of and means against Bruchus faba; edibility of the same.
- 1632. RILEY, C. V. On the transformations of the red mites. < Amer. Nat., March [23 February], 1878, v. 12, pp. 139-146, figs. 1-6. Habits, description, and figures of Trombidium locustarum [p. 142], T. gigantown [p. 143], T. musegyum [p. 144], and Hudwighum helestown [p. 146], p.
  - teum [p. 143], T. muscarum [p. 144], and Hydrachna belostomæ [p. 146], n. sp.; figures and description of most of the stages of the same; definition of Trombidium. [Advance extract from No. 1643.]
- 1633. RILEY, C. V.] Clothes moths. <Sci. Amer., 23 March, 1878 [v. 52], n. s., v. 38, p. 177. S.-b. No. 19, p. 238. Reprint: <Kansas Farmer, 17 April, 1878. S.-b. No. 19, p. 225. <Colman's Rural World, 3 April, 1878. S.-b. No. 19, pp. 198–199.

- 1633. RILEY, C. V.—Continued.
  - Indiscriminate use of names and habits of several species of *Tinea* injurious to woolen goods, fur, hair, and similar substances; means against the moths.
- 1634. RILEY, C. V. Pieris vernalis and P. protodice. <Ca. Ent., February [March], 1878, v. 10, p. 39.
  - Conformation of T. E. Bean's conclusion that P. vernalis is the spring form of P. protodice.
- 1635. RILEY, C. V. Migratory butterflies. <Sci. Amer., 6 April, 1878 [v. 52], n. s., v. 38, p. 215, fig. S.-b. No. 19, p. 250. Extract: <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 102, fig. 34.
  - Occurrence of migratory swarms of Danais archippus in central southern United States in the autumn of 1877, and of return migrations in spring; explanation of these migrations; mentions other migratory Rhopalocera; distribution of Danais archippus and Cynthia [=Pyrameis] eardui; figure of Danais archippus.
- 1636. RILEY, C. V. The horn-bug. <Sci. Amer., 20 April, 1878 [v. 52], n. s., v. 38, p. 249, 1 fig. S.-b. No. 19, p. 241.

  Natural history, description of egg, larva and pupa, and figures of larva, pupa, and imago of *Passalus cornutus*.
- 1637. RILEY, C. V. Egg-feeding mites. <Ca. Ent., March [April], 1878, v. 10, pp. 58-59.

  Citation of records of Acari feeding on eggs.
- 1638. [RILEY, C. V.] Bad work of the grain Aphis <N. Y. Tribune, 26 June, 1878. S.-b. No. 19, p. 224.

  Habits and ravages of and means against Aphis avenæ [= Nectarophora granaria].
- 1639. [RILEY, C. V.] Of Doryphora. <N. Y. Tribune, 26 June, 1878. S. b. No. 19, p. 243.

Natural history, enemies, and spread of *Doryphora decemlineata*; description of larva and imago; methods of using Paris green.

- 1640. RILEY, C. V. The apple-tree borer. <N. Y. Tribune, 24 July, 1878. S.-b. No. 19, p. 195.

  Means against Chrysobothris femorata.
- 1641. [RILEY, C. V.] The raspberry saw-fly. <N. Y. Tribune, 24 July, 1878. S. b. No. 19, pp. 197; 226. Habits of and means against Selandria [= Monophadnus] rubi.
- 1642. [RILEY, C. V.] Inquiring friends. <N. Y. Tribune, 24 July, 1878.
  S.-b. No. 19, p. 198.
  Means against Ægeria tipuliformis.
- 1643. [RILEY, C. V., et al.] First annual report of the United States Entomological Commission for the year 1877, relating to the Rocky Mountain locust and the best methods of preventing its injuries and of guarding against its invasions, in pursuance of an appropriation made by Congress for this purpose. With map and illustrations. <Washington, 29 July, 1878, pp. 16+

# 1643. RILEY, C. V.—Continued.

477+ 295, 111 figs., 5 pls., 2 maps. See: <Sci. Amer., 5 July, 1879 [v. 55], n. s., v. 41, p. 8. S. b. No. 23, p. 121.

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| 1644. RILEY, C. V. Attractive but untrue. <n. 31<="" td="" tribune,="" y.=""><td>July,</td></n.> | July,          |
| 1878. Sb. No. 19, p. 198.  |                |
| 30° 20° 20° 20° 20° 20° 20° 20° 20° 20° 2  | _              |

Absurdity of statement that "a parasite of the strawberry plant has been found to wage a war of extermination against the *Phylloxera*."

1645. RILEY, C. V. Locusts eat the castor bean. <N. Y. Tribune, 14 August, 1878. S.-b. No. 19, pp. 198, 227–228.

Acrididæ relish Fagopyrum and Linum but eat Ricinus communis with reluctance, though with impunity.

1646. [RILEY, C. V.] The stalk-borer. <N. Y. Weekly Tribune, 21 August, 1878, v. 37. S.-b. No. 19, pp. 227; 242-243; 244. Description, food-plants, and habits of larva and description of image of

Gortyna nitela; G. nebris a variety of G. nitela.

1647. RILEY, C. V. That hundred and fifty million dollars. <Sci. Amer., 24 August, 1878 [v. 53], n. s., v. 39, p. 117. S. b. No. 19, p. 245.

Critical review of sensational reports in current agricultural papers; an appropriation of \$5,000 made to the U.S. Department of Agriculture for cotton insect investigation.

1648. RILEY, C. V. Silk-worm breeding. <Sci. Amer., 24 August, 1878 [v. 53], n. s., v. 39, p. 119. S.-b. No. 19, p. 244.

Number of annual generations of Sericaria mori; inferiority of races breeding more than once annually.

1649. RILEY, C. V. Cotton-worm. < Daily Constitution [Atlanta, Ga.], 8 September, 1878, v. 11, No. 73, p. 1.

Aletia argillacea [=xylina] feeds from the extra-floral nectar-glands of the cotton-plant.

1650. RILEY, C. V. That "fatherless and motherless race." The basket-worm, alias drop-worm, alias bag-worm, Thyridopteryx ephemeræformis. <Sci. Amer. Suppl., 28 September, 1878, fig. S.-b. No. 19, pp. 245–246.

Critical review of W. H. Gibson's article extracts from author's "The bagworm," with additions; degradation and breeding habits of female Psychidæ; method of imagination, fecundation, and oviposition of Thyridop-

- 1650. RILEY, C. V.—Continued.
  - teryx ephemeræformis; description of eggs and figures of all other stages; down in which the eggs are enveloped is extruded from the abdomen with the eggs; food-plants, parasites, and means against the species; its follicles available for silk production; this species proterogynous but most insects proterandrous.
- on the structure and development of *Hornia*. < Kansas City Review of Science and Industry, September, 1878, vol. 2, No. 6, p. 353. S.-b. No. 19, p. 209. Reprint: < Proc. Amer. Assoc. Adv. Sci. for 1878 [14 July], 1879, v. 27, pp. 284–285. See: < Ca. Ent. September [October], 1878, v. 10, pp. 177–178.
  - Occurrence in *Epicauta* and *Macrobasis* of the hypermetamorphoses characteristic of *Meloidæ*; specification of the stages of the same; summary of the life-history of *Hovnia minutipennis* parasitic on *Anthophora abrupta*.
- 1652. RILEY, C. V. On the larval characteristics of Corydalus and Chauliodes, and on the development of Corydalus cornutus.

  <Kansas City Review of Science and Industry, September, 1878, v. 2, No. 6, p. 354. S.-b. No. 19, pp. 210-211. Reprint: <Ca. Ent., May, 1879, v. 11, pp. 96-98. <Proc. Amer. Assoc. Adv. Sci. for 1878, [14 July], 1879, v. 27, pp. 285-287. See: <Ca. Ent., September [October], 1878, v. 10, p. 178.
  - Characters and economic value of larva of Corydalus cornutus; characters in brief of the imago; characters of larva of Chauliodes; description of eggs of both genera; situation of egg-masses of Corydalus and physical character of their covering; description of respiratory apparatus and method of respiration of larvæ of Corydalus.
- 1653. RILEY, C. V. Biological notes on the gall-making *Pemphiginæ*. <a href="#"><a href="

Method of hibernation of gall-making Pemphigina on Ulmus.

- Note.—Nos. 1651–1653 and 1668—1669 were reprinted from Proc. Amer. Assoc. Adv. Sci., v. 27, under a separate cover. Salem, February, 1879.
- 1654. [RILEY, C. V.] The cottonwood killer. <N. Y. Weekly Tribune, 9 October, 1878. S.-b. No. 19, p. 242. Extract: <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 159-160.
  - Habits, ravages, and food-plants of Lina scripta; description of and means against the same; Trypeta pomonella an example of the acquisition of new habits in insects.
- 1655. [RILEY, C. V.] A new insect foe to green corn. <N. Y. Tribune, 9 October, 1878. S.-b. No. 19, pp. 234; 244. Ravages of Cetonia [= Euphoria] inda.
- 1656. [RILEY, C. V.] Inquiring friends. <N. Y. Tribune, 9 October, 1878. S.-b. No. 19, p. 245.
  - Ravages and food-plants of *Hylesinus opaculus*; impracticability of means against bark-borers in large trees.

- 1657. RILEY, C. V. Notes from the South. Facts about the cotton-worm. <Sci. Amer., 16 November, 1878 [v. 53], n. s., v. 39, pp. 312–313. S.-b. No. 19, pp. 213–214; 239–241. See: <Amer. Rural Home, 27 September, 1878. S.-b. No. 23, p. 128.
  - Note of a trip in the southern United States in 1878; commission to investigate insects injurious to the cotton-plant; food-plants and habits of the larva and image of Aletia argillacea [=xylina]; use of poisonous baits and of Paris green; Anomis exacta injurious in certain regions.
- 1658. RILEY, C. V. Some further facts regarding that "fatherless race." <Sci. Amer. Suppl., 30 November, 1878. S.-b. No. 19, pp. 238-239.
  - Description and figures of male copulatory organs of Thyridopteryx ephemeræformis; description of method of copulation; figures larva, pupa, imagos,
    and follicles of the same; "parthenogenesis, though not improbable, seldom takes place in this species;" nature of the down intermingled with
    the eggs; previous error concerning this down.
- 1659. [RILEY, C. V.] "The carpet bug." <N. Y. Tribune, 1 December, 1878. S.-b. No. 19, p. 236.
  - Ravages of and means against Anthronus scrophulariæ; figures larva, pupa and imago.
- 1660. [RILEY, C. V.] A bug that eats bees. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237. Reprint: <Prairie Farmer, 4 January, 1879, v. 50, p. 3. S.-b. No. 23, p. 110.</li>
  Description and habits of Phymata erosa.
- 1661. [RILEY, C. V.] Tomato worm. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237.
  - Excessive abundance of larva of Sphinx quinquemaculata [= Protoparce celeus] near Port Hope, Ontario, in 1878.
- 1662. [RILEY, C. V.] Worm snake. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237.

  Habits and abode of larvæ of Sciara sp. at Orange, Conn.
- 1663. [RILEY, C. V.] Carpet pests. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237.
  - Food habits, spread of, and means against Anthrenus scrophulariæ.
- 1664. RILEY, C. V. Corn worm. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, pp. 235; 237. Food-plants and means against Heliothis armigera.
- 1665. [RILEY, C. V.] Hessian-fly. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, pp. 235; 237.
  - Indications of the ravages of and food-plants of Cccidomyia destructor.
- 1666. [RILEY, C. V.] Apple-worm. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, pp. 235; 237.
  - Baldwin apples more exempt than other varieties from the attacks of the second broad of Carpocapsa pomonella.
- 1667. RILEY, C. V. Anent the English sparrow. <Evening Star [Washington, D. C.], 28 December, 1878, v. 52, No. 8030, p. 1. S.-b. No. 19, pp. 214–215; No. 23, p. 151.
  - Value of Passer domesticus as a destroyer of insects and in other respects; objections to the special protection of the same.

- 1668. RILEY, C. V. Silk-culture; a new source of wealth to the United States. <Kansas City Review of Science and Industry, 1878, v. 2, pp. 419–423. S.-b. No. 19, pp. 216–218. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1878, [14 July], 1879, v. 27, pp. 277–283. Extract: <Kansas Farmer, 1879: 26 February, 12 November. S.-b. No. 23, pp. 105–106; No. 39, pp. 91–92. See: <Ca. Ent., September [October], 1878, v. 10, p. 178. <St. Louis Globe-Democrat, 28 August, 1878. S.-b. No. 19, p. 203.
  - Practicability and desirability of the extensive establishment of silk-culture in the United States; sketch of efforts made towards such establishment; requisites to its success.
- 1669. RILEY, C. V. The philosophy of the movements of the Rocky Mountain locust. <Kansas City Review of Science and Industry, 1878, v. 2, pp. 424–427. S.-b. No. 19, pp. 218–220. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1878, 14 July, 1879, v. 27, pp. 271–277. See: <St. Louis Daily Globe-Democrat, 24 August, 1878, v. 4, No. 95.
  - Limits of breeding-grounds of and region invaded by Caloptenus spretus; causes, periods, and directions of flights of the same; causes of the limitation of the flights; ravages; generalizations regarding locust invasions; work of the U. S. Entomological Commission.
- 1670. RILEY, C. V. A complete life-history of the army-worm, *Leucania unipuncta*, and its parasites. <25th Ann. Rept. Secr. Mass. Board Agric. for 1877, 1878, pp. 243–253, figs.
  - Early history, synonymy, distribution, seasons, enemies, and parasites of Leucania unipuncta; habits of larvæ and of female imagos; descriptions of all stages; figures of all stages except the egg; figures of two unnamed parasitic Ichneumons. Parasitic habits of Exorista [= Nemoræa] leucaniæ, E. flavicauda, Microgaster [= Apanteles] militaris, Pezomachus minimus, and Ophion purgatus; descriptions of Microgaster [= A.] militaris, Mesochorus vitreus, and Ophion purgatum. Ichneumon leucaniæ also a parasite.
- dia, 1878, v. 3, pp. 1241–1243, 8 figs. S.-b. No. 10, pp. 192–194.

  Definition of the genus *Phylloxera*; list of the sixteen (16) described United States species; descriptions of their galls; distribution, history, description, and figures of various stages and ravages of and means against *Phylloxera vastatrix*.
- 1672. RILEY, C. V. Potato-bug. <Johnson's New Universal Cyclopædia, 1878, v. 3, pp. 1361-1364, 9 figs. S.-b. No. 10, pp. 195-198. List of principal enemies of potato-plant; spread, natural history, food-plants, enemies of, and means against Doryphora decemlineata; figures of the same in its different stages, and of Lydella [= Exorista] doryphora, Calosoma calidum, Hippodamia convergens, Mysia [= Anatis] 15-punctata, Arma [= Podisus] spinosus, Harpactor [= Milyas] cinctus, Perillus circumcinctus, and Doryphora juncta.
- 1673. RILEY, C. V. Weevil. < Johnson's New Universal Cyclopædia, 1878, v. 4, p. 1338, fig. S.-b. No. 14, p. 46.
  - Definition of "weevil;" mention of numerous species, with statement of their food-plants and manner of obtaining food; habits and means against Sitophilus [= Calandra] granaria and S. [= C,] or yzw.

- 1674. RILEY, C. V. The locust swarms that devastate the trans-Mississippi country; their source, movements, and eastern limit. <Western Farmer's Almanac for 1879, 1878, pp. 48–50. S.-b. No. 19, pp. 247–248.
  - Limits of the breeding-grounds of and of regions invaded by *Caloptonus spretus*; causes, periods, and directions of their flights; causes of the limitations of the same physical and principally atmospheric; amount of ravages.
- 1675. [RILEY, C. V.] Prof. Riley in favor of the birds. <Evening Star [Washington, D. C.], 9 January, 1879, v. 53, No. 8039, p. 3. S. b. No. 19, pp. 223–224; No. 23, p. 94.
  - From St. Louis [Mo.] Globe-Democrat. List of some birds which are beneficial to horticulture and some which are noxious.
- 1676. RILEY, C. V. Letter from Prof. C. V. Riley. <Colman's Rural World, 15 January, 1879. S.-b. No. 23, pp. 107–108.
  - Letter to N. J. Colman transmitting report as former treasurer of the Missouri State Horticultural Society; transmission of documents for distribution; proposal for a revised and condensed edition of author's reports as State entomologist of Missouri.
- 1677. [RILEY, C. V.] Michigan apples and codling-moth. <N. Y. Tribune, 15 January, 1879. S.-b. No. 23, p. 109.
  - Freedom of apples from *Carpocapsa pomonella* in 1878 in Michigan due to the smallness of the apple crop in 1877 and to the efforts made by the orchardists to exterminate the insects.
- 1678. RILEY, C. V. Notes on the *Aphidide* of the United States, with descriptions of species occurring west of the Mississippi. <Bull. U. S. Geol. and Geog. Surv. Terr., 28 February, 1879, v. 5, pp. 1–32, pl. 1–2, with 2 pp. expl. of pl. Separate: <Washington, 22 January, 1879, 32 pp., 2 pl., with 2 pp. expl. of pl. Abstract: <Sci. News, 15 April, 1879, v. 1, pp. 184–186.
  - Part 1, pp. 1-17, by C. V. Riley, entitled "Biological notes on the *Pemphiginæ*, with descriptions of new species;" history and description of *Schizoneura americana* n. sp. [p. 4], Colopha ulmicola, Pemphigus populi-monilis n. sp. [p. 13], P. populi-transversus n. sp. [p. 15], P. p.-ramulorum n. sp. [p. 16], P. accrifolii n. sp. [p. 16], P. fraxinifolii n. sp. [p. 17], and Hormaphis spinosus.
  - Part 2, pp. 18-32, by J. Monell, entitled "Notes on Aphidina, with descriptions of new species." Describes nine (9) new species of Siphonophora, five (5) of Aphis, two (2) of Rhopalosiphum, nine (9) of Callipterus, three (3) of Chaitophorus; description of other species of these genera and of Drepanosiphum and the genera above named; synoptic tables of some of the species.
- 1679. [RILEY, C. V.] . [Plant-lice on potatoes.] <N. Y. Tribune, 12 February, 1879. S.-b. No. 23, p. 109.
  - Aphididæ reputed injurious to potato plants, probably Aphis solani.
- 1680. RILEY, C. V. Missouri entomological reports. <Colman's Rural World, 19 February, 1879. S.-b. No. 23, p. 102.
  - Proposal for republication of the reports of the State entomologist of Missouri; reasons for the non-publication of a tenth report; sketch of what that report would have contained.

- 1681. RILEY, C. V. Entomological notes. The chinch-bug. <Farmer's Review. February, 1879, 2 figs. S.-b. No. 23, pp. 111-112.
  - Figures of all stages, ravages, natural history, and means against Blissus leucopterus; its method of hibernation, and the effect of weather upon it.
- 1682. RILEY, C. V. Notes on the apple-worm. <Colman's Rural World, 5 March, 1879. S.-b. No. 23, p. 102. Reprint with slight changes: <Amer. Nat., August [July], 1879, v. 13, pp. 523–524. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 238–239.

See No. 1721 for synopsis of contents.

- 1683. RILEY, C. V. The rice-weevil. Serious injury to stored and to cribbed corn. <Farmer's Review, March, 1879, fig. S.-b. No. 23, p. 99; 112.
  - Figures larva, pupa, and imago of Calandra oryzæ and imago of C. granaria; habits, ravages, and means against the same; description of egg and method of oviposition of C. oryzæ; use of carbon bisulphide against these insects; poisonous effects of eating the comminuted beetles.
- 1684. RILEY, C. V. [Letter to W. G. Le Duc.] < Boston Daily Herald, 4 April, 1879. < Psyche Advertiser, 11 April, 1879, v. 2, p. 9. < Ent. Nach., 1 July, 1879, jahrg. 5, p. 177.
  - The reason for which the author resigned as entomologist of the U.S. Department of Agriculture was not ill-health.
- 1685. RILEY, C. V. Preventing rot in plums. <N. Y. Tribune, 9 April, 1879. S.-b. No. 23, p. 110; 129.
  - Trapping and jarring recommended as a means against Conotrachelus nenuphar.
- 1686. [RILEY, C. V.] A new insect pest. < Colorado Farmer, 10 April, 1879, v. 12, No. 15, p. 6. S.-b. No. 23, p. 108.
  - Injury to orchards and ornamental trees in California by *Dorthesia* [characias?], introduced from Australia; ravages of *D. characias* in southern Africa; prospective ravages in California; means against it.
- 1687. RILEY, C. V. The nervous system and salivary glands of Phylloxera. <Psyche, 11 April, 1879, v. 2, pp. 225–226.
  - Correctness of E. L. Mark's conclusion that the author had mistaken nerve cords for tracheæ; dissent from M. Cornn's view that the root swellings caused by *Phylloxera* are due to mechanical action of the puncture and the subsequent absorption of liquids; swelling considered to be caused by the introduction of a salivary secretion.
- 1688. RILEY, C. V. Mr. Henderson's experiments. < Gardener's Mo. and Hortic., April, 1879, v. 21, pp. 120-121. S.-b. No. 23, p. 107.
  - Review of P. Henderson's "Carnivorous plants;" believes that Dionæa and Drosera are nourished by the insects digested by their leaves.
- 1689. RILEY, C. V. The migrations and hibernation of *Aletia argillacea*. <Washington [D. C.] World, 10 May, 1879. <Science News, 1 June, 1879, v. 1, pp. 230–232. S.-b. No. 23, pp. 119–120. <Sci. Amer., 14 June, 1879 [v. 54], n. s., v. 40, p. 375. <Galveston [Tex.] Daily News, 24 October, 1879, v. 38, p. 2.

- 1689. RILEY, C. V.—Continued.
  - S.-b. No. 23, pp. 166–167, No. 42, pp. 38–39. Abstract: <Amer. Nat., November [25 October], 1879, v. 13, p. 726. <Farmer's Review, September, 1879. S.-b. No. 23, p. 108.
  - Ravages of insects, particularly of Aletia argillacea [=xylina] in the United States; hibernation theories; author's belief in the probable hibernation of the moth in the southern parts of the cotton belt; species mistaken for Aletia; description and food-plants of Aspila virescens.
- 1690. RILEY, C. V. Insects affecting clover. <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 90; 97; 129.
  - Habits, ravages of and means against Hylesinus trifolii and Cecidomyia leguminicola; prior observations upon the same; characters distinguishing C. leguminicola from C. [= Diplosis] tritici and C. destructor.
- 1691. RILEY, C. V. [*Œcanthus niveus.*] <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 95; 98.
  - Occurrence of eggs of *Œcanthus niveus* in twigs of apple, raspberry, grape, and other plants; slight injuries to be expected from the same; means against them.
- 1692. [RILEY, C. V.] Insect powders and their use. <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 95; 96; 130-131.
  - Abstract of W. Saunders' "Insect powder," with additions; differences between Persian and Dalmatian insect powder; methods of using them against insects.
- 1693. [RILEY, C. V.] The grasshopper prospect. <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 98.
  - Prospect of injuries by Caloptenus spretus in 1879; a new species injurious in the Sierra Valley of California.
- 1694. RILEY, C. V. The westward progress of the imported cabbageworm. <Amer. Nat., June [20 May], 1879, v. 13, p. 393. See: <Colorado Farmer, 10 April, 1879. S.-b. No. 23, p. 108. <Farmer's Review, April, 1879. S.-b. No. 22, p. 64. <Colman's Rural World, 1879. S.-b. No. 23, p. 108. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, p. 239. Spread of *Pieris rapæ* into Illinois and Missouri; means against the same.
- 1695. [RILEY, C. V.] Lures for moths. <N. Y. Tribune, 28 May, 1879. S.-b. No. 23, p. 95.
  - Trapping Carpocapsa pomonella in shallow dishes of sweetened liquid more harmful than beneficial, as many useful insects are destroyed; the method serviceable against Heliothis armigera.
- 1696. [RILEY, C. V.] The currant-worm. <N. Y. Tribune, 11 June, 1879. S. b. No. 23, p. 106.
  - Description, habits, distribution, and spread of and means against *Nematus* ventricosus [=ribesii]; methods of using hellebore.
- 1697. [RILEY, C. V.] Sweet-potato beetle. <N. Y. Tribune, 11 June, 1879. S.-b. No. 23, pp. 106—107; 131.
  - Description of all stages, habits, food plants, and means against Coptocycla [= Cassida] nigripes.

- 1698. RILEY, C. V. [The seventeen year Cicada.] <N. Y. Tribune, 1879. Reprint: <Colman's Rural World, 25 June, 1879. S.-b. No. 23, p. 152.
  - Boundaries of the areas in which Cicada [= Tibicen] septendecim is expected to occur in 1879; request for information of its appearance.
- 1699. RILEY, C. V. The imported carpet-beetle, Anthrenus scrophulariae, L. <Farmer's Review, 1879, fig. S.-b. No. 23, pp. 96–98. Extract: <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 54.
  - Letter of J. H. Parsons, with answer; description of larva and image of *Anthrenus scrophularia*; its history, habits, ravages, and means against them; figures larva, pupa, and image.
- 1700. [RILEY, C. V.] The cheese-skipper. <N. Y. Tribune, 2 July, 1879. S.-b. No. 23, p. 93. Notice: <Farmer's Review, 7 September, 1879. S.-b. No. 23, p. 103.
  - Description of larva, pupa, and imago, habits and means against Piophila casei.
- 1701. RILEY, C. V. The thick-thighed walking-stick. <Sci. Amer., 5
  July, 1879 [v. 55], n. s., v. 41, pp. 7-8, fig. S.-b. No. 23, p. 121.
  Reprint, with slight changes: <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 241-245, pl. 3.
  Treats of Diapheromera femorata. See No. 1721 for synopsis of contents.
- 1702. RILEY, C. V. The cotton-worm. < Mobile Register, 9 July, 1879. S.-b. No. 68, p. 204. See: < Colorado Citizen, 17 July, 1879. S.-b. No. 23, p. 91. < Galveston News, 19 July, 1879. S.-b. No. 23, p. 93.
  - Remarks at the Cotton Exchange about prospective injuries from Alctia argillacea [=xylina]; sudden appearance and means against the same; more injurious in wet than dry weather.
- 1703. RILEY, C. V. Other insects affecting cheese. <N. Y. Tribune, 9 July, 1879. S.-b. No. 23, p. 92. Reprint: <Amer. Dairyman. <Western Rural, 9 August, 1879, v. 17, No. 32, p. 250. S.-b. No. 23, p. 92.
  - Habits and transformations of Tyroglyphus siro, Corynetes [= Necrobia] rufipes, and Dermestes lardarius; tenacity of life of the Tyroglyphus and assumption of Hypopus form by the same; anecdote of Latreille; injury done in cheese by Musca corvina.
- 1704. RILEY, C. V. Pupation of the *Nymphalidæ*. Abstract: <Psyche, 11 July, 1879, v. 2, pp. 249–251.
  - Notice of prevalent explanations of the manner in which suspended pupa of Lepidoptera support themselves while shedding the larval skin; explanation of the process in *Vanessa antiopa* and *Paphia glycerium*.
- 1705. RILEY, C. V. Fire-flies. <Sci. Amer., 26 July, 1879 [v. 55], n. s., v. 41, p. 49. S.-b. No. 23, p. 104.
  - Definition of "Fire-flies;" description of larva, pupa, and image of *Photinus pyralis*; *Photuris pennsylvanicus*, the commonest species in the more northern states; absence or imperfect development of wings in certain female *Lampyrida*.

- 1706. RILEY, C. V. Grape-scale insect, new species. < Pacific Rural Press, 16 August, 1879. S.-b. No. 32, p. 66.

  Answer to inquiry of editor of Press; a new coccid, allied to *Pulvinaria vitis*.
- 1707. RILEY, C. V. Dragon-flies. <Sci. Amer., 23 August, 1879 [v. 55], n. s., v. 41, p. 113. S.-b. No. 23, p. 100.

  Description and natural history of Libellulidæ.
- 1708. RILEY, C. V. Failure of tea roses. Habits of Fuller's rose beetle, Aramigus fulleri Horn. <Sci. Amer., 30 August, 1879 [v. 55], n. s., v. 41, p. 129, fig. S.-b. No. 23, pp. 114-116. Reprint: <Gardener's Mo. and Hortic., October, 1879, v. 21, pp. 310-311, fig. S.-b. No. 23, pp. 126-127. Reprint, with additions: <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 255-257, pl. 17, f. 2.
- 1709. RILEY, C. V. The "Devil's darning needle." <Sci. Amer., 6 September, 1879 [v. 55], n. s., v. 41, p. 148. S.-b. No. 23, p. 104. Review: <Sci. Amer., 27 September, 1879 [v. 55], n. s., v. 41, p. 194. S.-b. No. 23, p. 103½.

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- Diapheromera femorata winters in the egg-state; W. J. McGee confounds the above with a species of Ranatra; the term "Devil's darning needle" mostly associated in the popular mind with the dragon-flies (Libellulidae).
- 1710. [RILEY, C. V.] The red-spider on roses. <Sci. Amer., 13 September, 1879 [v. 55], n. s., v. 41, p. 161. S.-b. No. 23, pp. 116–117.
  - Nature, ravages, and means against *Tetranychus telarius*; habits and transformations of *Acarina*.
- 1711. RILEY, C. V. Philosophy of the pupation of butterflies. <Sci. Amer. Suppl. No. 193, 13 September, 1879, p. 3069, 3 figs. S.-b. No. 23, p. 125. Reprint: <Science News, 15 September, 1879, v. 1, pp. 346–350. Reprint with changes: <Nature, 16 October, 1879, v. 20, pp. 594–595. <Kosmos, January, 1880, bd. 6, pp. 313–318. <Proc. Amer. Assoc. Adv. Sci. for 1879, 1880, v. 28, pp. 455–463, figs. <Separate: Salem, Mass., July, 1880, 9 pp., 6 figs. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 162–167, figs. 65–70. Abstract: <The Field Nat. and Sci. Student, January, 1883, pp. 179–180. S.-b. No. 42, p. 1. <Bull. Philos. Soc. Wash., 1879, v. 3, pp. 41–43.
  - Illustrates the prevalent explanation of the manner in which suspended chrysalids become attached to their supports; describes and illustrates the more correct process; structure of the terminal joint of the chrysalis especially in Vanessa antiopa, Terias sp., Danais archippus, and Paphia glycerium.
- 1712. RILEY, C. V. Parasites of the cotton-worm. <Ca. Ent., September, 1879, v. 11, pp. 161--162.
  - List of parasites of Aletia argillacea [=xylina]; descriptions of Trichogramma pretiosa n. sp. [p. 161], Cirrospilus [= Tetrastichus] esurus n. sp. [p. 162], and Tachina aletia n. sp. [p. 162].

- 1713. RILEY, C. V. [Insect injurious to junipers.] < Ca. Ent., Septem. ber, 1879, v. 11, p. 177.
  - Junipers on Long Island injured by Dapsilia rutilana.
- 1714. RILEY, C. V. The imported cabbage-worm in the South. <Farmer's Review, September, 1879. S.-b. No. 23, p. 106. Spread of Pieris rape westward and southward; its present distribution; southern limit of distribution of Doryphora 10-lineata.
- 1715. RILEY, C. V. The shedding of the tracheæ and double cocoons. < Amer. Nat., October, 1879, v. 13, p. 652. Review of two notes by E. Potts.
- 1716. RILEY, C. V. Leaf-galls on the grape-vine. <N. Y. Tribune, 1 October, 1879. S.-b. No. 23, pp. 117; 173. See: <Kansas Farmer, 26 November, 1879. S.-b. No. 26, p. 9. < West. Rural, 10 December, 1879.
  - Habits, ravages, reproduction, and distribution of Phylloxera vastatrix.
- 1717. RILEY, C. V. The Croton bug as a library pest. < Library Journal, September-October, 1879, v. 4, p. 376. Letter to Weston Flint; ravages of and means against Blatta [=Ectobia] germanica.
- 1718. RILEY, C. V. The Ailanthus silk-worm, Attacus (Samia) cynthia. Science News, 15 October, 1879, v. 1, pp. 377–383. Extract: < Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 56-58, fig. 16. < Farmer's Review, 8 January, 1880, v. 4. S.-b. No. 23, pp. 167-168.
  - Description of eggs, larvæ, and imagos of Samia [ =Attacus] cynthia; history, food-plants, acclimation, and artificial rearing of the same, and of Samia [=Attacus] ricini; differences between the eggs, larvæ, and cocoons of the two species; availability of these and other species for silk-culture; superiority of Sericaria mori for this purpose; occurrence of parthénogenesis and of retardation of development in Bombycidæ.
- 1719. RILEY, C. V. The cotton-worm. Letter from Prof. C. V. Riley on some recent cotton-worm articles in the News. < Galveston Tex. Daily News, 24 October, 1879, v. 38, No. 185, p. 2. No. 23, pp. 164-165. Reply: < Ibid., 31 October, 1879, No. 191, p. 4.
  - \*Critical review of W. J. Jones's "The cotton caterpillar," and of Investigator's "The cotton-worm;" denics that Aletia argillacea [=xylina] hibernates in the pupa state; author not interested in entomological discoveries for mercenary ends.
- 1720. RILEY, C. V. [Spread of *Pieris rapw* into Alabama.] < Ca. Ent., October, 1879, v. 11, p. 196.
  - Pieris rapæ now quite common in Alabama; it has reached Selma but not Mobile.
- 1721. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 207-257, + 1 p. expl. of pl., pls. 1-7. Separate: <Washington, Octo-

| 1721. | RILEY, C. V.—Continued.   |       |
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<sup>\*</sup>Translation: <Acker- und Gartenbau-Zeitnng, 1 June, 1880, v. 11, p. 87, fig. S.-b. No. 23, p. —.

| 1721. | RILEY, C. V.—Continued.   |     |
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1722. RILEY, C. V. [Parasites bred from the cotton-worm.] <Ca. Ent.,
November, 1879, v. 11, p. 205.

Nine species of parasites have been bred from Aletia argillacea [=xylina].

- 1723. RILEY, C. V. The bee-moth. <N. Y. Tribune, 1879. Reprint: <Farmer's Review, 3 January, 1880. S.-b. No. 23, p. 158. Description of larva and imago, habits, ravages, and means against Galleria cereana.
- 1724. RILEY, C. V. The silk-worm; being a brief manual of instructions for the production of silk. <Special Report No. 11 [U. S.], Dept. Agric., Washington, 1879, pp. 31, 8 figs. Second edition: <Washington, 1882, 37 pp., 8 figs. Third edition: <Washington, 1883, 37 pp., 8 figs. Fourth edition: Fifth edition: Sixth edition: <Bull. No. 9 Div. Ent. U. S. Dept. Agric., 11 July, 1886, 65 pp., 29 figs., 2 pl. Seventh edition: <Ibid., April, 1888.

Treats of Sericaria mori. See No. 1721 for synopsis of contents.

- 1725. RILEY, C. V. London purple as an insecticide. <Farmer's Review, 29 January, 1880, v. 4, No. 5, p. —.
- 1726. [RILEY, C. V.] [The food-habits of thrushes.] <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, pp. 2-3.
  - Notice of S. A. Forbes' "The food-habits of thrushes;" incompleteness of our knowledge of the food-habits of birds and of *Carabida*; author's opinion favorable to the birds.
- 1727. [RILEY, C. V.] The grape Phylloxera in California. <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 3.
  - Phylloxera vastatrix as destructive to Vitis vinifera in California as in Europe; the winged female supposed not to have appeared yet in California; speculations upon this modification of habit, if true.

<sup>\*</sup>Translation: <Acker- und Gartenbau-Zeitung, 1 Angust, 1880, v. 11, p. 119, 2 figs. S.-b. No. 23, p. —. Extract: <Prairie Farmer, 22 November, 1879, v. 50, p. 370. S.-b. No. 23, pp. 168-169. <Amer. Rural Farmer, 18 December, 1879. S.-b. No. 45, pp. 23-24.

t Translation: < Acker- und Gartenbau-Zeitung, 1 Scptember, 1880, v. 11, p. 135, fig. S.-b. No. 23, p. 182.

- 1728. [RILEY, C. V.] On the hibernation of the cotton-worm, *Aletia* argillacea Hübn. <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, pp. 6-11, figs. 3-5; p. 15.
  - Advance print from Bull. No. 3 U. S. Ent. Commission, pp. 24-31. See No. 1736 for synopsis of contents.
- 1729. [RILEY, C. V.] [Inquilines in galleries of the common white-ant.] < Amer. Ent., January, 1880, [v. 3], n. s., v. 1, p. 15.
  - Trichopsenius depressus and three undescribed Aleocharini found inquilinous in galleries of Termes flavipes in Texas by E. A. Schwarz; the Trichopsenius previously known by a single specimen from Georgia.
- 1730. [RILEY, C. V.] Large white scale on acacias, etc. <Amer. Ent. January, 1880 [v. 3], n. s., v. 1, p. 20.
  - Occurrence and ravages of *Dorthesia characias*? in California and southern Africa; characters of the insect.
- 1731. [RILEY, C. V.] [Ravages of moths in cushions.] < Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 20.
  - Conclusions of discussion by German Society of Railway Companies as to the best method of preventing the ravages of moths in the cushions of railway carriages.
- 1732. [RILEY, C.V.] [Grape Phylloxera in Geelong, Victoria.] < Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 20.

  Occurrence of *Phylloxera vastatrix* in Geelong, Victoria.
- 1733. RILEY, C. V. Borers in black-ash: Fall web-worm: Apple-tree insects. < Amer. Ent., January, 1880 [v. 3], n. s., v. 1, pp. 22–23.
  - Black-ash trees in New York killed by the borings of Parandra brunnea; ash trees bored also by Trochilium [= Fatua] denudata; the leaves of the same and other trees destroyed by Hyphantria textor [= cunea]; apples injured by the "gimlet-worm"; habits, ravages of, and means against Bucculatrix pomifoliella; figure of cocoons and imago of this moth.
- 1734. [RILEY, C. V.] Skippers injuring smoked hams. < Amer. Ent., January, 1880, [v. 3], n. s., v. 1, pp. 23-24.
  - Answer to communication from E. A. Smith; hams injured by larvæ of *Pio-phila casei*; means against these and other insects injuring hams.
- 1735. [RILEY, C. V.] Tipula eggs in the stomach of the cat-bird. <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 24.
  - Answer to communication from S. A. Forbes; description of eggs and method . of oviposition of Tipula trivittata?
- 1736. RILEY, C. V. The cotton-worm. Summary of its natural history, with an account of its enemies and the best means of controlling it; being a report of progress of the work of the commission. <Bull. No. 3, U. S. Ent. Commission, 28 January, 1880, 144 pp., 1 pl., 84 figs. Extract: <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 67-68, figs. 19-20. <Farmer's Review, January, 1880, 2 figs. S. b. No. 23, pp. 163-164.

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1737. [RILEY, C. V.] The 17-year Cicada in Iowa. < Amer. Ent., February, 1880 [v. 3], n. s., v. 1, pp. 25-26.

Review of C. E. Bessey on the 17-year Cieada in Iowa; limits of the broods of 1854-1871, 1861-1878, and 1862-1879 of Cicada [= Tibicen] septendecem in Iowa; occurrence of the last brood in Missouri; comparison of the distribution of these broods with the distribution of timber trees.

- 1738. [RILEY, C. V.] Negetal-feeding ground-beetles. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.
  Notes from various sources upon the phytophagous habits of Carabida.
- 1739. [RILEY, C. V.] The pear-leaf blister. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26. Notice: <Ibid., March, 1880 [v. 3], n. s., v. 1, p. 74.
  - Review of T. J. Burrill's "The pear-leaf blister"; ravages of *Typhlodromus* pyri on leaves of pear-tree; characters of this mite; noxious habits of Acarina, especially of Phytoptus.
- 1740. [RILEY, C. V.] Fuller's rose-beetle in California. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.

  Occurrence and ravages of Aramigus fulleri in California.
- 1741. [RILEY, C. V.] Lepidium vs. bed-bugs. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.

  Notice of S. M.'s "Lepidium, the bed-bug destroyer;" Acanthia lectularia said to be attracted to and killed by Lepidium sp.
- 1742. [RILEY, C. V.] Aniseed and grain weevils. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.

  Notice of reports that Calandra granaria were attracted from grain to aniseed and killed by it.
- 1743. RILEY, C. V. Two valuable insecticides. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, pp. 41-45.

  From Bull. No. 3, U. S. Ent. Commission, pp. 60-65. See No. 1736, for synopsis of contents.
- 1744. [RILEY, C. V.] Use of buckwheat to destroy insects. < Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 48.

  Extract from "The Farmer" with remarks on the planting and plowing in of buckwheat as a means against injurious insects.
- 1745. [RILEY, C. V.] Tipula eggs in stomach of cat-bird. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 50.

  Answer to communication from S. A. Forbes; two kinds of eggs found in stomach of cat-bird; these birds eat gravid females of Tipula.
- 1716. [RILEY, C. V.] Beetles supposed to be feeding on wheat. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 50.

  Answer to letter from P. H. M.; larva of Cryptorhopalum sp. supposed to have injured grains of wheat, was probably feeding on the remains of true grain insects; food-habits of larvæ of Dermestidæ.
- 1747. RILEY, C. V. The apple-twig borer. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, pp. 50-51, figs. 11-12.

  Answer to letter from H. G. Wolcott; habits, food-plants, and means against Amphicerus bicandatus; figure of male and female imago and of bored apple-twigs; habits and food-plants of Sinoxylon basillare and of Bostrichus.
- 1748. [RILEY, C. V.] Stinging caterpillars. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 51.

  Answer to letters from T. Pollard and G.W. S.; food-plants, general appear-

Answer to letters from T. Pollard and G.W. S.; food-plants, general appearance, vernacular name, urticating properties and description of image of Lagoa opercularis.

- 1749. RILEY, C. V. A new genus of *Proctrotrupidæ*. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 52, figs. 13–14. Review: <1bid., December, 1880 [v. 3], n. s., v. 1, p. 293.
  - Description and figures of Didictyum [=Hexaplasta] zigzag n. g. et n. sp. reared from chrysalis of Aletia argillacea [=xylina].
- 1750. RILEY, C. V. Agricultural advancement in the United States. <Farmer's Review, 1880, v. 4: 4 March, p. 158; 11 March, p. 174. S.-b. No. 23, pp. 153–158. Notice: <*Ibid.*, 4 March, 1880, p.—. S.-b. No. 23, p. 150. Reprint: <Journ. Amer. Agric. Assoc., April, 1881, v. 1, pp. 47–54. Separate of reprint: <August, 1881, pp. 47–54.
  - Suggestions for the organization of an agricultural association; comparison of the relations of government to the advancement of agriculture in England, Germany, France, and the United States; necessary changes in the United States Department of Agriculture.
- 1751. RILEY, C. V. Parasites of the plum Curculio. <Farmer's Review, 4 March, 1880, v. 4, p. —, 2 figs. S.-b. No. 23, pp. 169–170.
  - Figures of larva, pupa, cocoon, and imagos of Sigalphus curculionis; habits, variations, usefulness, and dissemination of the same; habits, colors, and séasons of Porizon [= Thersilochus] conotracheli.
- 1752. [RILEY, C. V.] Trapping the carpet-beetle. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 53-55, fig. 15.
  - Figures larva, pupa, and imago of Anthrenus scrophularia; food-plants and habits of imago and ravages of larva; importation, distribution, vernacular names of and means against the same.
- 1753. [RILEY, C. V.] Silk-worm eggs: Silk culture. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 55.
  - Method of obtaining eggs of Sericaria mori and information on silk culture.
- 1754. [RILEY, C. V.] [Hickory Scolytus.] < Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 58.

  Occurrence of Scolytus quadrispinosus in Washington Territory.
- 1755. [RILEY, C. V.] [Tenacity of life.] <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 68.
  Resistance of Cleonus sp. to the influence of various insecticides.
- 1756. [RILEY, C. V.] [Danais archippus.] <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 73.
  - Occurrence of a colorational variety on the island of Antigua.
- 1757. [RILEY, C. V.] Reports of the U. S. Entomological Commission. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 73.

  Method of obtaining the first report of the U. S. Entomological Commission.
- 1758. [RILEY, C. V.] [Habits of the cotton-moth.] < Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 74.
  - Request for information on the habits of the imago and the food-plants of the larva of Aletia argillacea [=xylina] during March and April.
- 1759. [RILEY, C. V.] Typhlodromus pyri. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 74.

  Reference to early account of the pear-leaf blister-mite.

- 1760. [RILEY, C. V.] Food-habits of ground-beetles. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 75.
  - Note on request of S. A. Forbes for Carabidæ found in situations suggesting herbivorous habits.
- 1761. [RILEY, C. V.] Moths and butterflies caught by the tongue. <a href="mailto:Amer. Ent.">Amer. Ent.</a>, March, 1880 [v. 3], n. s., v. 1, p. 75.
  - Notice of several articles on the capture of Noctuida and Sphingida by the flowers of Physianthus albens; capture of Sphingida by the flowers of Nerium oleander and Enothera grandiflora, and of Syrphus sp. by the flowers of Bidens chrysanthemoides.
- 1762. [RILEY, C. V.] [Queen bees in the mails.] Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 75.
  - Circumstances under which queen bees may be sent by mail; exclusion of pinned insects from the same.
- 1763. [Riley, C. V.] Common tiger-beetle. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 77–78.
  - Answer to inquiry of J. L. Seney; habitat, distribution, and food-habits of Cicindela repanda.
- 1764. [RILEY, C. V.] Gall on *Pelargonium*. <Amer. Ent., March, 1880 (v. 3), n. s., v. 1, p. 78.
  - Answer to letter from Mary Treat; gall at base of *Pelargonium* probably made by a mite; the *Poduræ* found in it were undoubtedly feeding on diseased gall-tissue.
- 1765. [RILEY, C. V.] Catalogues and monographs of insects. < Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 78.
  - Answer to letter of P. S. B.; mention of monographic works and catalogues of North American insects.
- 1766. [RILEY, C. V.] Leaf-hoppers injuring wheat fields. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 78.
  - Answer to letter of R. L. B.; habits and ravages of Cicadula exitiosa, Diedro-cephala flaviceps, and Jassus sp. in the southern United States, and of Jassus sexnotatus in Europe; means against the same.
- 1767. RILEY, C. V. A new leaf-hopper injurious to small grain. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 78.
  - Description of *Diedrocephala flaviceps* n. sp. injurious to wheat and oats in Texas in 1876.
- 1768. RILEY, C. V. The bird question dispassionately considered. <Farmer's Review, 1 April, 1880, v. 4, p. 211. S.-b. No. 23, pp. 147–148.
  - Extract from E. Perris's "Birds vs. Insects," with introductory; conclusions as to the value of birds in agriculture as destroyers of noxious insects.
- 1769. RILEY, C. V. The cotton-worm in the United States. <Amer. Ent., April, 1880 [v.3], n. s., v.1, pp. 93-95. Reprint, with slight changes: <Proc. Amer. Assoc. Adv. Sci. for 1879, 23 February, 1881, v. 28, pp. 464-466. Separate of reprint: <Salem, Mass., August, 1880, 3 pp.
  - Date and manner of first appearance of larvæ of Aletia argillacea [=xylina]; number of annual generations and the existence of parasites upon it; his-

- 1769. RILEY, C. V.—Continued.
  - tory and refutation of the annual immigration theory; division of the cotton belt into regions wherein, respectively, A. argillacea [=xylina] is permanent and temporary; food-habits and enemies of the same.
- 1770. [RILEY, C. V.] The migrations of butterflies. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, pp. 100-102, figs. 34-35.
  - Migratory flights of Lepidoptera supposed to be due to excessive multiplication of individuals and to a true migratory instinct; direct ons, times, and extent of migrations of Danais archippus; explanation of the migratory instinct; distribution of D. archippus and Pyrameis cardui; figures the former and its manner of clustering.
- 1771. [RILEY, C. V.] Gouty gall on blackberry and raspberry canes. <Amer. Ent., April, 1880 [v, 3], n. s., v. 1, p. 107.
  - Answer to letters of P. S., T. A. C., and J. W.; seasons, ravages of and means against Agrilus ruficollis.
- 1772. [RILEY, C. V.] Sowing cotton seeds in hot-beds and transplanting as a means of preventing injury from the cotton-worm. <Amer. Ent., April, 1883 [v. 3], n. s., v. 1, p. 107.
  - Impracticability of W. J. W.'s suggestion as indicated in title.
- 1773. [RILEY, C. V.] Not the cotton-moth. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 107.
  - Answer to inquiry of D. B. Woodbury; food-plants of Tolype velleda.
- 1774. [RILEY, C. V.] Moths caught in Alabama: Muscle-shaped bark-louse on apple-trees South <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, pp. 107-108.
  - Mentions several insects received from J. F. Bailey, of Marion, Ala.; larva of Papilio philonor feeds on Aristolochia; Bombus virginicus Q robs hives of Apis mellifica; Mytilaspis pomicorticis [=pomorum] not before received from so far south; means against the same.
- 1775. [RILEY, C. V.] Chrysalides supposed to be those of Aletia. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 108.
  - Answer to letter of W. J. Jones; pupe of Agrotis inermis [=saucia] and Prodenia lineatella from cotton field.
- 1776. [RILEY, C. V.] Apple-twig borer. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 108.
  - Answer to inquiry of T. V. M.; occurrence and habits of Amphicerus bicaudatus.
- 1777. [RILEY, C. V.] Clover-weevil. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 108.
  - Answer to inquiry of W. W. F.; several "weevils" infest clover-seeds; Hylesinus trifolii infests the roots and lower part of the stem.
- 1778. [RILEY, C. V.] Effects of cold applied to the chrysalides of butterflies. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 110-111.

  Notice of the experiments of W. H. Edwards; effects of hibernation in the chrysalis and imago states.
- 1779. [RILEY, C. V.] Moth issuing from a larva. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 114.
  - Notice of J. J. Weir on the issuance of Orgyia sp. from the larva without passing through the pupal stage.

- 1780. [RILEY, C. V.] The rose-slug. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 115-116, figs. 42-43.
  - Description of eggs, larvæ, and imago, history and means against Selandria [=Monostegia] rosæ; figures, egg, larvæ, imago, with details of structure, and injured leaf.
- 1781. [RILEY, C. V.] Dr. Asa Fitch. <Amer. Ent., May, 1880 [v. 3], n. s, v. 1, pp. 121-123.
  - Biographical sketch of Asa Fitch, with notice of his collection of insects and his writings.
- 1782. [RILEY, C. V.] Flea-beetle on young tobacco plants. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 123.
  - Leaves of Nicotiana tabacum eaten by Epitrix hirtipennis [= Crepidodera parvula] and probably by E. [= C.] cucumeris; leaves of Solanum eaten by the first named and by E. [= C.] brevis; distribution of these and other species of Epitrix [= Crepidodera].
- 1783. [RILEY, C. V.] The proboscis of the common house-fly. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 125. Review of paper by G. Macloskie.
- 1784. [RILEY, C. V.] Notes on South American Lepidoptera. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 125–126.
  - Report of meeting of the Entomological Society of London; length of proboseis of and presence of scent organ in *Sphingidw*; perception of colors in *Rhopalocera*; secondary sexual character in *Callidryas* and other genera; according to R. Meldola the proboseis of *Macrosila cluentius* is 23.5cm (94 inches) long.
- 1785. [RILEY, C. V.] Floating apiaries. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 126-127.
  - Notice of an unsuccessful attempt to increase the product of an apiary by floating it southward late in the season and back to the north in the spring, on the Mississippi River.
- 1786. [RILEY, C. V.] American *Staphylinidæ* wanted. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 127.
  - Notice of A. Fauvel's works on *Staphylinidæ* and his request for additional material.
- 1787. [RILEY, C. V.] Probable parthenogenesis in the Hessian fly. <a href="#"><Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 127.</a>
  - Review of paper by H. A. Hagen; Cecidomyia destructor less injurious than formerly in the older wheat-growing regions, its area of abundance having moved westward with the westward extension of wheat culture.
- 1788. [RILEY, C. V.] Raspberries destroyed by weevils. < Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 127.
  - Ravages of Otiorhyuchus picipes in England; warning against its introduction into the United States.
- 1788a. [RILEY, C. V.] Cotton culture and the insects affecting the plant at Bahia, Brazil. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 128-129.
  - Letter of R. A. Edes, with remarks on specimens sent.

1789. [RILEY, C. V.] Hemispherical larva at bottom of ant hill. < Amer. Ent., May, 1880 | v. 3], n. s., v. 1, p. 129.

Answer to inquiry of D. S. Sheldon; habitat of larva of Microdon globosus.

1790. [RILEY, Č. V.] Chrysalides dug up in cotton field, mistaken for those of the cotton-worm. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 129.

Answer to letter of R. Worrel.

1791. [RILEY, C. V.] Aleurodes on Oxalis. < Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 129-130.

Answer to letter of S. A. Conrad; description of all stages of Aleurodes sp. from leaves of Oxalis sp.

- 1792. [RILEY, C. V.] Larvæ in stomach of black-bass. < Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 130.
  - Answer to inquiry of S. A. Forbes; two coleopterous larvæ from the stomach of *Micropterus salmoides*; one a dytiscid, the other perhaps a dascyllid.
- 1793. [RILEY, C. V.] Insects from stomach of rock-bass. < Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 130.

Answer to letter of S. A. Forbes; coleopterous larva from the stomach of common sun-fish (*Lepiopomus pallidus*) and rock-bass (*Roccus lineatus*).

- 1794. [RILEY, C. V.] New enemy to sugar-cane. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 130, fig. 48.
  - Answer to letter of D. Th.; ravages of Ligyrus rugiceps upon sugar-cane, maize, and grasses; recommends use of lamp and kerosene pan, and figures one form of such apparatus.
- 1795. [RILEY, C. V.] Parasites of the plum Curculio. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 131-132, figs. 49-50.
  - Answer to letter of W. S. Barnard; quotes from 3d Ann. Rept. State Ent. Mo., pp. 24-26; habits of Sigalphus curculionis; habits, varieties, and figures of all stages of the same; food-habits of Semasia [= Grapholitha] prunivora on which the Sigalphus is parasitic.
- 1796. [RILEY, C. V.] Blister-beetles from New Mexico. < Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 132.

Answer to inquiry of J. M.; Macrobasis albida common in the Southwest and valuable as a vesicant; Diplotaxis not known to be a vesicant.

- 1797. [RILEY, C. V.] Abnormal cocoon. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 132.
  - Answer to letter of W. S. Barnard; occurrence of Callosamia [= Attacus] promethea and Orgyia antiqua at Ithaca, N. Y.; description of abnormal ecocon of the latter found on sugar-maple.
- 1798. [RILEY, C. V.] Insects found about orange-trees. < Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 132.
  - Answer to inquiry of J. S. Barnwell; list of insects from Darien, Ga.; most of them have no relation to orange trees; notes on Aphis sp., Chilocorus bivulnerus, Syrphus sp., Neoclytus erythrocephalus, Drasterius amabilis, Platynus punctiformis, Forficula sp., Gryllotalpa borealis, and Psocus venosus.

- 1799. [RILEY, C. V.] Luperus brunneus, Crotch. <Amer. Ent., May, 1880, [v. 3], n. s., v. 1, p. 132.
  - Luperus noxius Riley MSS., is a pale form of L. brunneus; description of the typical and other forms of the same; distinctive characters of L. brunneus and L. morulus from other North American species and from each other; characters of the genus Calomicrus.
- 1800. [RILEY, C. V.] Professor Riley on army-worms. <N. Y. Weekly Sun, 20 June, 1880. S.-b. No. 26, p. 89.
  - Interview with reporter; summary of present knowledge of Leucania unipuncta.
- 1801. RILEY, C. V. Cotton-caterpillars. <Selma [Ala.] Times, 25 June, 1880.
- 1802. RILEY, C. V. Notes on our commoner insects. < Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 133, 134, figs. 51-52.
  - Description and figures of larva, pupa, cocoon, and image of Arctia [= Pyrrharctia] isabella; habits, seasons, food-plants, parasites, vernacular names and variations of the same; figure of Ophion macrurum; descriptions of Ichneumon caruleus, I. signatipes, and Trogus obsidianator; description of larva of Ecpantheria scribonia.
- 1803. RILEY, C. V. The white-grub fungus. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 137-140, figs. 53-55.
  - Description and figures of *Torrubia ravenclii* and of its fructification; forms in which it occurs on larvæ of *Lachnosterna quercina* [= fusca]; list of some articles upon it; its synonymy and distribution; list of related species and their distribution; occurrence of related species on other insects.
- 1804. RILEY, C. V. The true and the bogus Yucca moth, with remarks on the pollination of Yucca. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 141–145.
  - History of observations on *Prodoxus decipiens*; habits, parasite, and foodplants of the same; evolution of *Prodoxus* and *Pronuba*; criticism of errors resulting from mistaking *Prodoxus decipiens* for *Pronuba yueeasella*; failure of *Yucca angustifolia* to become fertilized in the absence of *Pronuba yueeasella*; *Hyponomeuta quinquepunctella* Chambers is the same as *Prodoxus decipiens*.
- 1805. [RILEY, C.V.] Intermittance of phosphorescence in fire-flies. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 146.
  - 'Criticism of a discussion before the London Entomological Society; the winged imagos of Lampyrida can intermit their light; the larvae and wingless imagos can suppress their light.
- 1806. [RILEY, C. V.] Grain Aphis vs. rust. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 147.
  - Ravages of Aphis avena [Nectarophora granaria] and of rust on wheat and oats in Georgia; the work of aphides promotes the growth of some kinds of rust.
- 1807. [RILEY, C. V.] Mold and Phylloxera. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 147.
  - Criticism of statements by Rommier; development of mycelium on phyllox-erized roots does not result in the destruction of the *Phylloxera*.

- 1808. [RILEY, C.V.] Infecting Phylloxera with fungus disease. < Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
  - Abstract of discussion at meeting of Académie des Sciences de Paris on the infection of *Phylloxera vastatrix* by parasitic fungi; particular fungi infect only particular insects; method of experimentation to determine which fungi to use and how to apply them; improbability of success in these experiments.
- 1809. [RILEY, C. V.] Fungus in Cicada. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
  - Notice of C. H. Peck's description and J. Leidy's note on Massospora cicadina; Cicada [= Tibicen] septendecim and C. [= T.] tredecim subject to the attacks of the same.
- 1810. [RILEY, C. V.] On the nature of the phosphorescence of the glowworm. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
  - Conclusions drawn by Jonsset de Bellesme; probability that the phosphorescent substance is a gaseous product; nature of phosphorescence.
- 1811. [RILEY, C. V.] Death of mules caused by insects. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
  - About 6,000 mules reported killed in the Onachita Valley, Louisiana, by the attacks of Simulium sp.
- 1812. [RILEY, C. V.] [May beetles swarming in Alabama.] <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
  - Abundance and ravages of Lachnosterna quercina [=fusca] on oak-trees around Mobile, Ala., in May, 1880.
- 1813. [RILEY, C. V.] Fungus diseases of beneficial insects. < Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
  - Abstract of communication by C. Brongniart and Max Cornu on an epizootic among Syrphus mellinus caused by a species of Entomophthora; almost all insecticides liable to the objection that they kill useful as well as noxious insects.
- 1814. [RILEY, C. V.] Early appearance of cotton-worm. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
  - Extracts from letter of J. M. Bell and from the Goliad [Tex.] Guard and from G. Witting on the date of appearance of Aletia argillacea [= xylina] in Texas.
- 1815. [RILEY, C. V.] The butterfly tongue. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
  - Notice of and extract from paper by E. Burgess; conclusions as to the manner in which butterflies imbibe their liquid food.
- 1816. [RILEY, C. V.] Cottony maple scale. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
  Notice of J. D. Putnam on Pulvinaria innumerabilis.
- 1817. [RILEY, C. V.] Necrological. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 150.
  - Obituary notices of E. A. H. v. Kiesenwetter, S. C. Snellen van Vollenhoven, and F. L. de Laporte.
- 1818. [RILEY, C. V.] Effects of severe cold on insects. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 150.

A steady even if severe winter not prejudicial to insect life.

- 1819. [RILEY, C. V.] Revision of the *Lampyridæ*. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 150.
  - Notice of H. S. Gorham's work on the Lampyrida and his request for additional material.
- 1820. [RILEY, C. V.] Apple-twig borer. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 151.
  - Answer to inquiry of A. S. H.; occurrence of Amphicerus bicaudatus on appletrees in Virginia.
- 1821. [RILEY, C. V.] Grape-vine flea-beetle. < Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 152–153.
  - Answer to letter of J. Nilis; ravages of Graptodera [= Haltica] chalybea on grape-vines in Pennsylvania.
- 1822. [RILEY, C. V.] Cynipid gall on oak twigs. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 153, fig. 56.
  - Answer to letter of J. A. Warder; figure of gall of *Cynips* (u. sp.?) from twig of *Quercus prinus* var. acuminata; comparison of this gall with that of C. [=Andricus] q.-punctata; the flies bred from these galls issue in spring and are all females, but probably have a bisexual form producing a different gall.
- 1823. [RILEY, C. V.] White-grub fungus. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 153.
  - Answer to letter of H. S.; occurrence of Torrubia ravenelii at Iola, Kans.
- 1824. [RILEY, C. V.] Galerita janus. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 153, fig. 57.
  - Answer to inquiry of H. D. M. Fair; distribution, habitat, transformations, and seasons of Galerita janus; figure of larva of G. lecontei.
- 1825. [RILEY, C. V.] Not Fuller's rose-beetle. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 153-154, fig. 58.
  - Answer to inquiry of J. Stewart; habits and synonymy of Agonoderus comma [=pallipes]; figure of the same.
- 1826. [RILEY, C. V.] Not *Aletia* chrysalides. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 154.
  - Answer to letter of G. P. White; pupe of Agrotis saucia from cotton fields; food-habits of larva; ravages of Aletia argillacca [=xylina] at Brown Station, Ala., in August, 1879.
- 1827. [RILEY, C. V.] Mud-wasp and parasite. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 154, figs. 59-60.
  - Answer to inquiries of Mary Treat; nidification of several species of Odynerus; food-habits of O. birenimaculatus; figure of O. flavipes and of a nest of Odynerus sp.; figure of Cryptus junceus.
- 1828. [RILEY, C. V.] Monographs again. <Amer. Ent., June, 1880, [v. 3], n. s., v. 1, pp. 154-155.
  - Answer to letter of C. D. Marsh; references to works. Elaterida, Curculionida and Coccida.
- 1829. [Riley, C. V.] Rearing wood-borers. < Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 155.
  - Answer to letter of W. H. Harrington; directions for rearing larvæ which bore in wood or under bark,

- 1830. RILEY, C. V. On a new tineid genus allied to *Pronuba*, Riley. <a href="#"><Amer. Ent., June, 1880, [v. 3], n. s., v. 1, pp. 155–156.</a>
  - Description of *Prodoxus* n. g. [p. 155] of *Tineina* and of larva, pupa, and imagos of *P. decipiens* n. sp. [p. 155].
- 1831. RILEY, C. V. A parasite on *Prodoxus decipiens*. <Amer. Ent., June, 1880, [v. 3], n. s., v. 1, p. 156.

Description of larva and imago of Exothecus prodoxi n. sp.; habits of larva.

1832. RILEY, C. V. How to manage the cotton-worm: Suggestions to cotton planters. <Farmer's Review, 8 July, 1880. S.-b. No. 24, p. 68.

Means against Aletia xylina.

- 1833. [RILEY, C. V.] The cotton-worm investigation. <Selma [Ala.]

  Morning Times, 21 July, 1880, v. 55, No. 190, p. 3. Reprint:

  <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 197.
  - List of persons engaged in the cotton-worm investigation; statement of work to be done by each.
- 1834. [RILEY, C. V.] A foe to cottonwood. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 159-161, figs. 61-64. Extract: <Suppl. to Amer. Ent., July, 1880, p. 1.
  - Description of egg, larva, and image and figures of all stages of Melasoma [= Lina] scripta; description and figures of variations of the image; habits, ravages, seasons, food-plants, and means against the same; figure of M. [= L.] lapponica and of larva of M. [= L.] populi; description of these larvæ and of that of M. [= L.] tremulæ; food-plants and distribution of these species; acquisition of new habits by insects.
- 1835. [RILEY, C. V.] The northern army-worm. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 170-171, figs. 72-75.
  - Ravages of Leucania unipuncta in 1880; natural history, means against, description, and figures of all stages of the same.
- 1836. [RILEY, C. V.] The periodical Cicada. <Amer. Ent.. July, 1880 [v. 3], n. s., v. 1, pp. 172–173, fig. 76.
  - Broods of Cicada [= Tibicen] septendecim and C. [= T.] tredecim which appear in 1880.
- 1837. [RILEY, C. V.] Use of guano for grape Phylloxera. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 173. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 2.
  - Application of sulphide of carbon with infusorial earth or guano.
- 1838. [RILEY, C. V.] Fertilizers of alpine flowers. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 175. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 2.
  - Relative frequency, according to H. Müller, of the visits of insects to flowers in high alpine regions as compared with such visits at lower levels.
- 1839. [RILEY, C. V.] Carnivorous habits of caddis-worms. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 176.
  Notice of paper by G. C. Goody.

- 1840. [RILEY, C. V.] Development of the eyes and luminosity in the fire-flies. < Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 176. Abstract of H. S. Gorham's observations.
- 1841. [RILEY, C. V.] Grape Phylloxera not at the Cape. < Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 176. Reprint: < Suppl. to Amer. Ent., July, 1880, p. 1.
  - Examination of roots of unhealthy vines by R. McLachlan and R. Trimen show that the disease of the vines is not caused by *Phylloxera vastatrix*.
- 1842. [RILEY, C. V.] · [Bill providing for the extermination of insects.] <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 176–177.

  Text of and comments on a bill introduced into the California Assembly, providing for the extermination of insects.
- 1843. [RILEY, C. V.] [Appropriation for the U. S. Entomological Commission.] <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 177.

  Notice of the appropriation by Congress of \$25,000 for completing the work of the U. S. Entomological Commission.
- 1844. [RILEY, C. V.] Pronuba vs. Prodoxus. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 177-178.

  Comments on letter of V. T. Chambers.
- 1845. [RILEY, C. V.] Interesting cotton-worm notes from Vera Cruz, Mexico. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 179. Reprint with slight omission: <Suppl. to Amer. Ent., July, 1880, p. 3.
  - Letters from S. T. Trowbridge and R. de Zayas Enriquez, with notes on the irregular occurrence of Aletia argillacea [=xylina] in Vera Cruz.
- 1846. [RILEY, C. V.] Clover-root borer. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 179-180, fig. 81. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 4. See: <Prairie Farmer, 31 July, 1880. S.-b. No. 45, p. 15.
  - Answer to letter of W. A. Henry; description and figures of larva, pupa, and imago of *Hylesinus trifolii*; ravages, habits, and means against the same.
- 1847. [RILEY, C. V.] Mud-wasp and spider egg-nest. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 180, figs. 82–84.
  - Answer to letter of Mary Treat; figures of cells and of imago of Eumenes fraterna, which stores its cells with larvae of Paleacrita vernata; figure and descriptions of egg-nests of Epeira sp.
- 1848. [RILEY, C. V.] Worm in joints of wheat. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 180–181, fig. 85. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 4.
  - Answer to letter of J. K. P. Wallace; ravages of an unknown, apparently hymenopterous, larva in wheat stalks; figure of larva and pupa of *Meromyza americana* and of stalks injured by the same.
- 1849. [RILEY, C. V.] Linden and ash destroyers. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 4.

- 1849. RILEY, C. V.—Continued.
  - Answer to letter of Shelby Reed; season of appearance of Odontota rubra on Tilia; larvæ of Hyphantria textor [= cunea] feeding on the same; Saperda calcarata boring in poplar, and an unknown larva (Neoclytus capræa?) boring in black-ash.
- 1850. [RILEY, C. V.] Larva boring along the axis of apple-twigs. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181.
  - Answer to letter of T. V. Munson; twigs of apple-trees bored by larvæ of Oberca sp.?
- 1851. [RILEY, C. V.] Aquatic larvæ. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181.
  - Answer to letter of S. A. Forbes; larvæ of Anax junius and Palingenia [= Hexagenia] bilineata named; the latter common in the stomach of fishes.
- 1852. [RILEY, C. V.] First appearance of cotton-worm in prairie belt. Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181. Reprint: <Suppl. to Amer. Ent., July, 1880, pp. 3-4.
  - Answer to letter of J. F. Bailey; larvæ of Aletia argillacea [=xylina] appear first on lands where the cotton is luxuriant.
- 1853. [RILEY, C. V.] Gyrinus larva; terrestrial insects in stomach of shad. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 182.
  - Answer to letter of S. A. Forbes; character of larva of *Gyrinus*; a mass of terrestrial insects including *Typhlocyba vitis*? a muscid, a Eurytomid, *Jassus* sp., *Triphleps insidiosus*, and other species from the stomach of Ohio shad.
- 1854. RILEY, C. V. Further remarks on the differences between *Pronuba* and *Prodoxus*. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 182.
  - Differences between Pronuba yuccasella and Prodoxus decipiens in the form, sculpture, and color of the terminal joint, and of the ovipositor.
- 1855. [RILEY, C. V.] The grape-vine flea-beetle, *Graptodera chalybea* Illig. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 183–184, fig. 86.
  - Habits, seasons, ravages of, and means against *Graptodera* [= *Haltica*] chalybea; figures, injured leaf, and larvæ, cocoon, and image of the same.
- 1856. RILEY, C. V. Further notes and observations on the armyworm. <Amer. Ent., 1880 [v. 3], n. s., v. 1: August, pp. 184, 185; September, pp. 214, 215. Reprint, with changes: <Sci. Amer., 4 September [v. 57], n. s., v. 43, p. 152. S.-b. No. 23, pp. 161–162.
  - Progress of knowledge upon the number of annual generations of *Leucania unipuncta*; stages of growth at which it hibernates; the destructive generation probably not the first of the season; explanation of the partial efficacy of the burning of fields in winter as a means against this insect; connection of wet and dry seasons with its increase; its natural habits; errors of A. Fitch.
- 1857. [RILEY, C. V.] Sprinklers and atomizers. <Amer. Ent., 1880 [v. 3], n. s., v. 1: August, pp. 185-189, figs. 87-98; September, pp. 211-214, figs. 111-117.
  - Extracts from pp. 56-57 and reprint of pp. 85-94 of Bull. No. 3, U.S. Entomological Commission. See No. 1736 for synopsis of contents.

- 1858. RILEY, C. V. The use of pyrethrum. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 193-195.
  - Record of experiments by W. A. Henry upon the effect of Pyrethrum powder on *Halticidw*, *Meloidw*, *Pieris rapw*, *Coreus* [= *Anasa*] *tristis*, and *Blattidw*; and of the fumes of burning pyrethrum on various insects.
- 1859. [RILEY, C. V.] [Colorado potato-beetle in New Hampshire.] <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 195. Ravages of *Doryphora* 10-lineata in Coos County, N. H., in 1879.
- 1860. [RILEY, C.V.] Retarded development in a blister-beetle. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 196. Final transformations of individuals from a single batch of eggs of *Epicauta vittata* occurring at the first, second, and third year after hatching.
- 1861.-[Riley, C. V.] . Ox-eye daisy as an insecticide. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 196.

  Experiments by W. S. Barnard upon the effect of alcoholic extracts of the flowers and stems of the ox-eye daisy on insects; "no evidence that they will prove of any practical value."
- 1862. [RILEY, C.V.] Directions for raising pyrethrum. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 197. Directions for sowing the seeds and cultivating the plants of pyrethrum.
- 1863. [RILEY, C. V.] State Entomologist for New York. < Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 197, 198.

  Notice of the appointment of J. A. Lintner as State Entomologist of New York.
- 1864. [RILEY, C. V.] Economic investigations in the South and West. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 198.

  Meeting of the U. S. Entomological Commission; plan of work to be done in 1880-1881; partial list of persons engaged in the work.
- 1865. [RILEY, C. V.] [Number of entomologists in Europe.] <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 198.

  Tabulation of the number of entomologists of the several countries of Europe.
- 1866. [RILEY, C. V.] [Catalogus coleopterorum by Gemminger and Harold.] <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 199. Commendation of the above work and of the supplementary list of Elateridæ by E. Candèze; need of eo-operation for the completion of the whole catalogue.
- 1867. [RILEY, C.V.] Carnivorous propensity of plant-feeders. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 200.

  Larvæ of Plusia brassicæ devour those of Pieris rapæ and Pionea rimosalis in default of more natural food.
- 1868. [RILEY, C. V.] Beetles injuring cabbages and fuchsias. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 200, fig. 106.

  Answer to letter of G. T.; ravages, distribution, and figures of Epicarus imbricatus; description of eggs, ravages, food-plants, and means against Graptodera [= Haltica] carinata.
- 1869. [RILEY, C. V.] Spider and nest. < Amer. Ent., August, 1880, [v. 3], n. s., v. 1, p. 200.

  Answer to letter of Mrs. I. B. Harrison: distribution and distinctive charge.

Answer to letter of Mrs. J. B. Harrison; distribution and distinctive characters of Acrosoma stellatum.

- 1870. [RILEY, C. V.] Damage to wheat: Worm boring in the stalk. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 201.
  - Answer to letter of A. R. Frost; food-plants and ravages of larva and figure of larva and imago of Gortyna nitela.
- 1871. [RILEY, C. V.] Larvæ from stomach of blue-bird. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 201.
  - Answer to letter of S. A. Forbes; larva of Meracantha contracta and of Callimorpha sp. from stomach of blue-bird; habits and characters of the same.
- 1872. [RILEY, C. V.] Butterfly larva injurious to cotton squares. <a href="#"><Amer. Ent.</a>, August, 1880 [v. 3], n. s., v. 1, p. 201.
  - Answer to letter of B. F. Cooke; larva of *Theela* (pæas?) feeding on leaves and bolls of cotton-plant; a species of *Microgaster* parasitic in the larva.
- 1873. [RILEY, C. V.] Cut-worms from stomach of robin. < Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 201.
  - Answer to letter of S. A. Forbes; larvæ of Agrotis (messoria?) from stomach of robin; Agrotis cochrani = A. messoria.
- 1874. [RILEY, C. V.] Large phosphorescent larva. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 201–202, fig. 108.
  - Answer to letter of S. F. Clarke; occurrence in Maryland and Missouri of a luminous larva (Melanactes sp.?) [= Phengodes sp.]; figures of the larva, of its head and leg enlarged and of its probable parent; occurrence in the more northern States of a similar larva, probably that of Asaphes memnonius.
- 1875. RILEY, C. V. Worms injuring wheat. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 202.
  - Answer to letter of J. Monaghan; ravages of larva of Meromyza americana.
- 1876. RILEY, C.V. Ash-rootborer: Supposed eggs of Odontota. < Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 202-203.
  - Answer to letter of Shelby Reed; habits and ravages of *Parandra brunnea*; *Pimpla* sp. parasitic upon its larva; probable manner in which the eggs of *Odontota rubra* are laid.
- 1877. [RILEY, C. V.] Army-worm notes and inquiries: Its work on clover. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203. Answer to letter of L. T. Derousse; Leucania unipuncta frequently leaves clover-plants untouched while eating the grasses growing with the clover, but under some circumstances destroys young clover-plants.
- 1878. [RILEY, C. V.] Ichneumon from stomach of bluebird. <Δmer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203.
  - Answer to letter of S. A. Forbes; Lampronota sp. eaten in quantity by bluebirds.
- 1879. [RILEY, C. V.] Leaf-miner on white oak. < Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203.
  - Answer to letter of E. W. Claypole; description, habits, and ravages of Litho-colletis cincinnatiella.
- 1880. [Riley, C. V.] Screw-worm: Its parentage in doubt. < Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203.

Answer to letter of A. R. 'Kilpatrick; Lucilia macellaria supposed to be the parent of the "screw-worm"; food-habits of certain Muscide.

- 1881. [RILEY, C. V.] Silk culture: How to dispose of cocoons. < Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 203-204.
  - Answer to letter of C. F. Durksen; need of silk-filatures in the United States; present means of selling cocoous.
- 1882. [RILEY, C. V.] Best cotton-worm destroyer. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 204.
  - Answer to letter of J. G. Dauterive; reference to the most reliable poison and the best machines and methods for applying poison to kill Aletia argillacea [=xylina].
- 1883. [RILEY, C. V.] Twice-stabbed lady-bird. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 204, fig. 109.
  - Answer to letter of H. N. Patterson; Coccinellidæ beneficial by feeding on Aphididæ and Coccidæ; figure of Chilocorus bivulnerus; significance of the presence of this beetle in large numbers on trees.
- 1884. [RILEY, C. V.] Pseudo-scorpion. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 204.
  - Answer to inquiry of C. H. S. Davis; habitats and food-habits of Chelifer cancroides and other Chernetide.
- 1885. [RILEY, C. V.] Bluebirds feeding on parasitic and predaceous insects. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 204–205.
  - Answer to letter of S. A. Forbes; bluebirds more destructive to parasitic and predaceous insects than the thrushes; percentage of such food found in the stomachs of the bluebird; larvæ of Leucania unipuncta, Telephorus bilineatus, and Nephelodes violans eaten by the same; probable hibernation of the first named; habits, hibernation, distribution, and popular name of the Nephelodes.
- 1886. RILEY, C. V. The cotton destroyers. <New Orleans Democrat, 21
  September, 1880, v. 5, No. 276, p. 8. S.-b. No. 23, pp. 170-173.
  Reprint: <Selma [Ala.] Times, 29 September, 1880. <Southern Enterprise [Atlanta, Ga.], December, 1880, v. 5, pp. 77-82.
  S.-b. No. 23, pp. 184-189; No. 61, pp. 3-5; No. 63, pp. 57-59; 60-62. Reprint, with slight changes: <Proc. Amer. Assoc.
  Adv. Sci. for 1880, 14 October, 1881, v. 29, pp. 642-649. Separate: <Salem, July, 1881, pp. 26-33. Extract: <Sci. Amer., 16
  October, 1880 [v. 57], n. s., v. 43, p. 241. S.-b. No. 23, pp. 159-160. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, pp. 245-247. <Prairie Farmer, 30 October, 1880, v. 51, No. 44, p. 2. S.-b. No. 23, pp. 153. Abstract: <Farmer's Review, 7 October, 1880. S.-b. No. 23, pp. 162-163. <Journ. Appl. Sci., November, 1880, v. 11, pp. 170-171.
  - Facts and principles established by the U. S. Entomological Commission, applicable to the whole cotton belt, regarding the times and manner of first appearance of Aletia argillacea [= xylina] and Heliothis armigera upon the cotton-plant; habits of the larvæ and imagos and the best means of destroying the same; relative efficacy of several insecticides; methods of preparing and applying the same; importance of early poisoning; main object of the cotton-worm inquiry accomplished.

- 1887. [RILEY, C. V.] The use of poisons to destroy insects. <Farmer's Review, 23 September, 1880, v. 5, p. 200. S.-b. No. 23, pp. 148-149; 165-166. Reprint: <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 244.
  - Advocacy of the use of Paris green and London purple as means against certain insects; danger of the use of the same against many insects; criticism of A. J. Cook's, recommendation for their use against *Paria atcrrima* and *Carpocapsa pomonella*; limitations within which they may be used.
- 1888. [Riley, C. V.] Supplementary instructions to agents of the United States Entomological Commission. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 218.
  - Call for experiments to ascertain the minimum quantity of poisons which can be used effectually against Aletia argillacea [=xylina]; effect of poisons on the several stages of this insect; food-plants, parasites, and enemies of the same; effect of yeast ferment upon it.
- 1889. RILEY, C. V. Dimorphism in locusts (*Acridida*). < Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 219-220.
  - Review of paper by S. H. Scudder; certain forms described as species of *Pezotettix* are dimorphic forms of *Caloptenus*; extract from 8th Ann. Rept. State Ent. Mo., 1876, p. 115.
- 1890. [RILEY, C. V.] A scale insect on maple hitherto unobserved by American entomologists. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 220-221.
  - Notice of paper by Miss E. A. Smith, with emended reprint of a portion of the same; habits, colors, and behavior of young larvæ and transformations of the male of *Pseudococcus accris*.
- 1891. [RILEY, C. V.] How flight in insects is directed. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 221.
  - Abstract of paper by Jousset de Bellesme; direction of flight not determined by the motion of the wings, but principally by the displacement of the center of gravity, resulting from the changes of position of other parts of the body.
- 1892. [RILEY, C. V.] Entomological work at the Department of Agriculture. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 222.

  Notice of the continuation of the appropriations by Congress for field-work and experiments in the entomological division of the U. S. Department of Agriculture.
- 1893. [RILEY, C. V.] Entomological papers read before the A. A. A. S. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 223.

  Titles of twenty-eight [28] papers read at the Boston meeting.
- 1894. [RILEY, C. V.] Entomologists at Boston. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 223.

  Notice of the 29th meeting of the A. A. A. S. at Boston, August-September,
- 1895. RILEY, C. V. Winged Phylloxera in California. Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 224-225.

1880.

Letter from J. S. Hyde, with remarks; extracts from papers by E. W. Hilgard; winged fertile females of *Phylloxera vastatrix* found in California; local evidence of the spread of this insect; means of eradicating the same.

- 1896. [RILEY, C. V.] Worm infesting meal sacks. < Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 229.
  - Answer to letter of J. Greenwood, jr.; description of larva and imago of Ephestia zew [=interpunctella]; food-habits of the larva.
- 1897. [RILEY, C. V.] Hesperid larva feeding on Canna. < Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 229.
  - Answer to letter of N. S. Reed; occurrence of *Pamphila ethlius* in Illinois and South Carolina; its larva injurious to *Canna flaccida*.
- 1898. [RILEY, C. V.] Grape-vine apple-gall. < Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 229, fig. 119.
  - Answer to letter of A. R. McCutchen; occurrence of *Cecidomyia? vitis-pomum* and of *Calosoma scrutator* in Georgia; figures gall of the first named; foodhabits of the *Calosoma*.
- 1899. [Riley, C. V.] Apple-tree plant-lice in Oregon. Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 229-230.
  - Answer to letter of H. B. May; occurrence and ravages of Aphis mali? in Oregon; means against the same.
- 1900. [RILEY, C. V.] Phylloxera work. Wood-lice on grape-vine roots. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 230.
  - Answer to letter of H. B. Trimble; occurrence of *Phylloxera vastatrix* at West Chester, Pa.; roots of grape-vines destroyed from unknown cause, perhaps by young of *Phyloscia* or *Porcellio*.
- 1901. RILEY, C. V. New hickory galls made by Phylloxera. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 230.
  - Description of *Phylloxera caryæ-scissa* n. sp. and *P. caryæ-avellana* n. sp. from Florida; larva of *Diplosis* found in the galls.
- 1902. RILEY, C. V. Food-habits of the longicorn beetles or wood-borers. <a href="#"><Amer. Ent., 1880 [v. 3], n. s., v. 1; October, pp. 237–239; November, pp. 270–271.</a>
  - Food-plants and food-habits of the *Prionidæ* and *Cerambycidæ* of the United States.
- 1903. [RILEY, C. V.] Additional experiments with Pyrethrum. < Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 242.
  - Details of experiments made by H. G. Hubbard on the effect of very minute quantities of Pyrethrum powder on very young larvæ of Aleta argillacea [=xylina].
- 1904. [RILEY, C. V.] A new enemy to the strawberry. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, pp. 242-243, fig. 121.
  - Review of paper by A. J. Cook; extracts from the same; description and habits of larva and imago of *Paria aterrima*; means against the imago; habits of larva of *Colaspis flavida*; figure of the same; number of segments and spiracles in larva of Coleoptera.
- 1905. [RILEY, C. V.] A new enemy to corn: The long-horned Diabrotica. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 247.
  - Notice of recent articles on the ravages of the larva of Diabrotica longicornis; food-habits and means against the same; food-habits of Drasterius amabilis.
- 1906. [RILEY, C. V.] Phylloxera congress in Spain. < Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 247.
  - Notice of a congress to be held in Spain to consider all topics connected with the ravages of *Phylloxera vastatrix*.

- 1907. [RILEY, C. V.] The grape Phylloxera not permanently destructive. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.
  - Recovery of grape-vines formerly injured by *Phylloxera vastatrix* in California and Missouri; belief that in Europe grape-vines will be grown again on the lands of late years ravaged.
- 1908. [RILEY, C. V.] Sale of silk-worm eggs. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.
  - \$6,000,000 worth of silk-worm eggs sent from Japan to France via San Francisco in each of the four years 1874-1877.
- 1909. [RILEY, C. V.] [Death of S. S. Haldeman.] < Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.

  Obituary notice.
- 1910. [RILEY, C. V.] [Retirement of Mr. Fuller.] <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.
  - Announcement of the retirement of A. S. Fuller as assistant editor of the American Entomologist.
- 1911. [RILEY, C. V.] Insect enemies of growing rice. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 253.
  - Answer to letters of J. L. Leconte and J. Screven; ravages of and means against the "grub" [== Chalepus trachypygus] and the "maggot" [== Lissorhoptrus simplex] in rice fields in Georgia.
- 1912. [RILEY, C. V.] Blind-eyed *Smerinthus*. <Amer. Ent., October 1880 [v. 3], n. s., v. 1, p. 254.
  - Answer to inquiry of Mrs. J. B. Harrison; occurrence at lamp-light in N. H. of Smerinthus excacatus; food-plant of the larva of the same.
- 1913. [RILEY, C. V.] White waxy secretion on stems of bitter-sweet. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254.
  - Answer to inquiry of J. A. Lintner; method of oviposition and characters of egg-mass of *Enchophyllum* [= *Enchenopa*] binotata; seasons, habits, and food-plants and description of the eggs of the same.
- 1914. [RILEY, C. V.] Prickly-ash larva: Tachinid eggs. < Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254.
  - Answer to inquiry of R. W. Jones; larva of Papilio cresphontes on prickly ash; eggs of Tachina sp. on larva of Aletia argillacea [=xylina].
- 1915. [RILEY, C. V.] Worms on cabbage: Boll-worm feeding on leaf. <a href="#"><Amer. Ent.</a>, October, 1880 [v. 3], n. s., v. 1, p. 254.
  - Answer to inquiry of R. W. Jones; food-habits of larvæ of Heliothis armigera and of Pionea rimosalis.
- 1916. [RILEY, C. V.] Buggy peas. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254.
  - Answer to letter of A. Berger; abundance of Bruchus pisi in Wisconsin; means against it.
- 1917. RILEY, C. V. Glow-worm. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254, fig. 123.
  - Answer to letter of J. J. Dean; occurrence of larva of *Photuris pennsylvanica* at Chatham, N. J.; figures larva and imago of the same: larva and imago of *Photinus pyralis*, also luminous; males and females of these species winged; female of *Lampyris noctiluca* wingless and more luminous than the male.

- 1918. [RILEY, C. V.] The use of fungus growths to destroy insects. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, pp. 269-270.
  - Abstract of paper by A. N. Prentiss; the constant presence of spores of fungi in the air vitiates the value of most experiments on the application of the fungi to insects; insects rarely affected by the spores which are in the air while the plants are more so affected; yeast more injurious mechanically than infectiously.
- 1919. [RILEY, C. V.] New species of scale insects. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, pp. 275-276.

  Review of paper by W. H. Ashmead on the red scale.
- 1920. [RILEY, C. V.] Remedy for cabbage worms. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 276.

  Pyrethrum powder the most satisfactory means against all larger affecting
  - Pyrcthrum powder the most satisfactory means against all larvæ affecting the leaves of cabbage.
- 1921. [RILEY, C. V.] Pyrethrum for the screw-worm. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 276.
  - Notice of paper by A. R. Kirkpatrick; directions for the use of pyrethrum powder against the "screw-worm" [= Lucilia macellaria]; objections to the use of other remedies.
- 1922. [RILEY, C. V.] Oviposition in the *Tortricidæ*. <Amer. Ent. November, 1880 [v. 3], n. s., v. 1, p. 276.

  Notice of and extract from paper by C. H. Fernald.
- 1923. [RILEY, C. V.] About *Phora* being merely a scavenger and not a true parasite. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 277.
  - Letter from C. R. Osten Sacken, with remarks; Phora alctic not a parasite; oviposition and habits of larva of the same.
- 1924. [RILEY, C. V.] Gall on Solidago leaves. < Amer. Ent., November, 1880 [v. 3], n. s.; v. 1, p. 278.
  - Answer to letter of H. Barnes; occurrence of galls of Cecidomyia carbonifera on leaves of Solidago nemoralis? at Mulberry Corners, Ohio.
- 1925. [RILEY, C. V.] Oak gall: *Cynips q.-decidua* Bass. < Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 278.
  - Answer to letter of J. Schenck; galls of Cynips q. decidua? found on leaves of Quercus muhlenbergii at Mount Carmel, Ill.
- 1926. [RILEY, C. V.] Insects from stomach of lark, robin, and sunfish. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 278.
  - Answer to letter of S. A. Forbes; Diplotaxis sordida from stomach of meadow-lark; egg of a reduviid from that of a robin; larva of an ephemerid (Polymitarcys alba?) from the stomach of a sunfish.
- 1927. [RILEY, C. V.] Supposed hibernating Aletia chrysalis. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 278.
  - Answer to letter of J. W. Davidson; pupa resembling that of Achatodes zew found in stalk of maize at Uniontown, Ala.
- 1928. RILEY, C. V. On the natural history of certain bee-flies (Bomby-liidæ). <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp.

- 1928. RILEY, C. V.—Continued. 279-283, figs. 147-151. Review: <Ent. Mo. Mag., February, 1881, v. 17, pp. 206-207.
  - Advance print of pp. 262-267 and a general abstract of pp. 267-269 of the section entitled "Bee-fly larvæ, family Bombyliidæ," in 2d Rept. U. S. Entomological Commission. See No. 1959 for synopsis of contents.
- 1929. RILEY, C. V. On a new pyralid infesting the seed-pods of the trumpet-vine. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp. 286-288, figs. 152-153.
  - Description, with figures, of Clydonopteron n. g. [p. 287] and of larva, pupa, and image of C. tecomæ n. sp. [p. 288], and of the abode of this insect in pods of the trumpet-vinc; habits of the insect.
- 1930. [RILEY, C. V.] Experiments with yeast-ferment on various insects. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp. 289, 290.
  - Reports by J. E. Willet and A. J. Cook upon their experiments in the application of beer and yeast to various insects; no infection communicated to the insects by these applications.
- 1931. RILEY, C. V. Notes on the imported elm leaf-beetle. < Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp. 291-292.
  - Answer to letter of J. L. Leconte; seasons, transformations, enemies, and ravages of and means against Galeruca xanthomelæna; hibernation of Chrysomeliāæ.
- 1932. [RILEY, C. V.] Synonyms of parasites' mistakes corrected. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 293. Review: <Ca. Ent., February, 1881, v. 13, pp. 31-33, fig. 3.
  - Review of paper by L. O. Howard; comparison of the alleged characters of Antigaster and Eupelmus to show grounds for the founding of the former; Didictyum synonymous with Hexaplasta; H. zigzag not a parasite of Aletia argillacea [= xylina], but of Phora aletia; habits of H. zigzag.
- 1933. [RILEY, C. V.] "A mystery in reference to *Pronuba yuccasella.*" <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 293.

  Critical review of paper by H. A. Hagen, who confounded *Prodoxus decipiens* with *Pronuba yuccasella*.
- 1934. [RILEY, C. V.] Mandible of Lithocolletis guttifinitella. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 294, fig. 138. Figure, with explanation, of the mandible of Lithocolletis guttifinitella.
- 1935. [RILEY. C. V.] Excessive injury by a beetle in Russia. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 294.

  Ravages of Anisoplia austriaca in southern Russia; description of the same; its habits and vernacular name.
- 1936. [RILEY, C. V.] Chemical change in the color of butterfly-wings. <a href="#"><Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 294.</a>
  Note on paper by W. H. Edwards and J. M. Wilson.
- 1937. [RILEY, C. V.] Fungus foes. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 297.
  - Answer to inquiry of J. J. Brown; Cis fuscipes and all Cioidæ infest fungi growing on old trees and logs.

- 1938. [RILEY, C. V.] The twig-girdler. <Amer. Ent., December, 1880 [v 3], n. s., v. 1, p. 297, figs. 155–156.
  - Answer to letter of W. R. Maxwell; figures of larva, pupa, and imago of *Oncideres cingulata* and of twig injured by the imago; food-plants, habits, and transformations of this insect.
- 1939. [RILEY, C. V.] The bedeguar of the rose. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 298, fig. 154.
  - Answer to letter of L. C. Bryan; account of the gall of Rhodites rosæ; figure of the same.
- 1940. [RILEY, C. V.] Minute borers in cherry, peach, and plum-trees. <a href="#"><Amer. Ent.</a>, December, 1880 [v. 3], n. s., v. 1, p. 298.
  - Answer to letters of J. L. Bennett and M. H. Boye; ravages, food-plants, and distribution of Scolytus rugulosus; food-habits of the species of Scolytus.
- 1941. [Riley, C. V.] Smilax injured by cut-worms. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 298.
  - Answer to letter of G. Thommen; habits, ravages, and food-plants of Agrotis saucia.
- 1942. [RILEY, C. V.] Honey-producing oak-gall. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 298.
  - Answer to letter of H. C. McCook; secretion of saccharine matter by galls growing on Quercus undulata; description of these galls, Cynips quercus-mellaria n. sp.; Myrmcocystus hortus-deorum [= melliger] collects the saccharine matter from these galls.
- 1943. [RILEY, C. V.] Dr. Hagen's mystery. <Ca. Ent., December, 1880, v. 12, pp. 263-264.
  - Review of paper by H. A. Hagen; Prodoxus decipiens confounded with Pronuba yuccasella.
- 1944. RILEY, C. V. Acorn-gall. <Trans. Acad. Sci. St. Louis, 1880, v. 4, p. 1 Proc.
  - Gall mistaken for abortive acorn, by G. B. Emerson, in his "Trees and shrubs of Massachusetts."
- 1945. RILEY, C. V. Silk-culture in the United States. Condensed account of the silk-worm and how to inaugurate a new source of wealth. <Western Farmer's Almanac for 1881, 1880, pp. 35-39, 4 figs. S.-b. No. 23, p. —.
  - Practicability and desirability of the culture of *Scricaria mori* in the United States; requisites to its success; superiority of *S. mori* over all other insects for silk-culture; brief illustrated natural history of the same; directions for silk-culture.
- 1946. RILEY, C. V. Legislation to control insects injurious to vegetation. <Farmer's Review, 20 January, 1881. S.-b. No. 23, p. 148. Reprint: <Amer. Nat., April [25 warch], 1881, v. 15, pp. 322–323. <Indiana Farmer, 16 April, 1881. S.-b. No. 23, p. 149. Notice: <Farmer's Review, 20 January, 1881. S.-b. No. 23, p. 170.
  - Appointment of C. H. Dwinelle, by the California State Horticultural Society, on a committee to consider what legislation is desirable to check the spread of noxious insects and to force land-owners to destroy the same; notice of the previous passage of such laws and of anticipated objections to them.

- 1947. RILEY, C. V. Larval habits of bee-flies, *Bombyliidæ*. <Amer. Nat., February [25 January], 1881, v. 15, pp. 143–145, figs. 1–3. Notice: <Western Stock Journ. and Farm, March, 1881, v. 11, p. 58.
  - Habits of Systachus and Triodites as parasites on eggs of Acridida; notice of paper by T. A. Chapman; figures larva, pupa, and imago of Systachus oreas and compares its larvae and pupae with those of Bombylius major.
- 1948. RILEY, C. V. Experiments with pyrethrum: Safe remedies for cabbage-worms and potato-beetles. <Amer. Nat., February [25 January], 1881, v. 15, pp. 145-147.
  - Details of experiments made by A. J. Cook and W. R. Hubbert upon the effect of a dusting of pyrethrum powder upon larvæ of *Pieris rapæ*, larvæ and imagos of *Doryphora* 10-lineata, and upon *Eriosoma* [= *Pemphigus*] tessellata, Coreus [= Anasa] tristis, and flies and mosquitoes.
- 1949. RILEY, C. V. Insect enemies of the rice-plant. < Amer. Nat., February [25 January], 1881, v. 15, pp. 148-149.
  - Chalepus trachypygus feeds on roots of the rice-plant; conjectures as to other enemics of the rice-plant; Cecidomyia oryzæ injurious to the same in India.
- 1950. [RILEY, C. V.] The "yellow-fever fly." < Amer. Nat., February [25 January], 1881, v. 15, p. 150.
  - Review of paper by H. A. Hagen; food-habits of larvæ of Sciara sp.; occurrence of swarms of images of the same.
- 1951. [RILEY, C. V.] An aquatic Sphinx larva. <a href="Amer. Nat.">Amer. Nat.</a>, February [25 January], 1881, v. 15, p. 151.

  Abstract of paper by H. A. Hagen.
- 1952. RILEY, C. V. Notes on the grape Phylloxera and on laws to prevent its introduction. <Amer. Nat., March [24 February], 1881, v. 15, pp. 238-241. Notice with extracts: <Pacific Rural Press, 23 April, 1881. S.-b. No. 42, p. 17.
  - Remarks upon letter of I. Bush; precautions to be adopted against the introduction of *Phylloxera vastatrix*; summary of the life-history of the same.
- 1953. RILEY, C. V. Hibernation of the cotton-worm moth: Ease with which mistakes are made. <Amer. Nat., March [24 February], 1881, v. 15, pp. 244-245, figs. 1-3.
  - Extract from letter of I. A. Wimbish; Leucania unipuncta mistaken for Aletia argillacea [=xylina]; characters of Aletia; figures ovipositor and eggs of L. unipuncta and images of both species.
- 1954. [RILEY, C. V.] On some interaction of organisms. < Amer. Nat., April [25 March], 1881, v. 15, pp. 323–324.
  - Review of paper by S. A. Forbes, with extracts; relative unimportance of special parasites as compared with predaceous animals of varied tastes in the limitation of the numbers of any species of animals; need of conservative action and exhaustive inquiry in the attempt to interfere with the order of nature.
- 1955. [RILEY, C. V.] Insect locomotion. <Amer. Nat., April [25 March], 1881, v. 15, p. 325.
  - Results of G. Carlet's studies on the order in which the feet are moved in the walking of Hexapoda and Arachnida.

- 1956. [Riley, C. V.] Plant-feeding habits of predaceous beetles. <Amer. Nat., April [25 March], 1881, v. 15, pp. 325–327.</p>
  - Citation of evidence from numerous sources proving that certain Carabidæ and Coccinellida oceasionally feed on plants, seeds, and spores.
- 1957. RILEY, C. V. Notes on Papilio philenor. < Amer. Nat., April, [25 March], 1881, v. 15, pp. 327–329, figs. 1–3.
  - Description of egg and newly-hatched larva of Papilio philenor; figure of larva, chrysalids, and imago of the same; food-plants, distribution, and its occurrence in swarms.
- 1958. [RILEY, C. V.] Entomological notes. < Amer. Nat., April [25] March], 1881, v. 15, pp. 330-331.
  - Notice of H. A. Hagen's paper on Simulium pictipes, with additional notes; abstracts and minor notices of other papers and items of news.
- 1959. [RILEY, C. V.] Second report of the United States Entomological Commission for the years 1878 and 1879, relating to the Rocky Mountain locust and the Western cricket, and treating of the best means of subduing the locust in its permanent breeding grounds, with a view of preventing its migrations into the more fertile portions of the trans-Mississippi country in pursuance of appropriations made by Congress for this purpose, with maps and illustrations. < Washington: 1880 [4 April, 1881], pp. 18+322+80, 10 figs., 17 pl., 9 maps.

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- 1960. RILEY, C. V. Notes on North American Microgasters, with descriptions of new species. <Trans. Acad. Sci. St. Louis, 16 April 1881, v. 4, pp. 295-315, 9 figs. Separate: <[St. Louis, Mo.], 6 April, 1881, 20 pp., 9 figs.
  - Characteristics and habits of the *Microgasters*; description of larva of *Apanteles aletiæ*; the cocoons and their construction; effect of the parasites upon the longevity of the host; secondary parasites; habits and descriptions of several new species and varieties, for a list of which see the *Systematic Index*; figures *A. aletiæ*, healthy and parasitized larvæ of *Chærocampa pampinatrix* [= *Ampelophaga myron*]; also mass of *Microgaster* cocoons, and the formation of the cocoon by the larva.
- 1961. [RILEY, C. V.] Exuviation in flight. < Amer. Nat., May [16 April], 1881, v. 15, p. 395.
  - Criticism of R. McLachlan's observations; process of casting subimaginal skin in *Polymitarcys alba*.
- 1962. RILEY, C. V. The rascal leaf-crumpler in Georgia. <Amer. Nat., May [16 April], 1881, v. 15, p. 400.
  - Occurrence and ravages of Acrobasis nebulo [=indiginella] in Bryan County, Georgia.
- 1963. [RILEY, C. V.] Vertical vs. horizontal insect boxes. <Amer. Nat., May [16 April], 1881, v. 15, p. 401.
  - Review of pamphlet by A. Preudhomme de Borre; reply of G. H. Horn to Preudhomme de Borre.
- 1964. [RILEY, C. V.] Insects affecting the China tree. <Amer. Nat., May [16 April], 1881, v. 15, pp. 401-402.
  - General immunity of the China tree from the attacks of insects and its consequent value as a shade tree; occurrence of a *Lecanium* and *Ccroplastes* n. sp. upon it in Alabama; injuries to its leaves by *Atta fervens* in Texas.
- 1965. [RILEY, C. V.] Galls on *Eucalyptus*. <Amer. Nat., May [16 April], 1881, v. 15, p. 402.
  - Critical review of paper by R. McLachlan; the supposed dipterous galls probably cecidomyidous; the supposed lepidopterous galls probably not lepidopterous, but inhabited by a lepidopterous inquiline,

- 1966. [RILEY, C. V.] North American Anthomyidæ. <Amer. Nat., May [16 April], 1881, v. 15, p. 402.

  Notice and summary of paper by H. A. Hagen.
- 1967. [RILEY, C. V.] Galls and gall-insects. <Amer. Nat., May [16 April], 1881, v. 15, pp. 402-403.
  - Review of paper by H. F. Bassett, with additional notes on the gall of Cynips [= Andricus] quercus-californica found on Quercus douglasii and infested by Ozognathus cornutus; the Cynips produced from this gall all females; earlier accounts of the gall and of the habits of O. cornutus.
- 1968. RILEY, C. V. Scale insect on raspberry. <Farmer's Review, 21 April, 1881, v. 6, p. 243. S.-b. No. 23, p. 150. Reprint: <Amer. Nat., June [19 May], 1881, v. 15, p. 487.
  - Remarks on communication from R. B. Fulton; occurrence and ravages of a scale (Diaspis harrisii?) [= Chionaspis furfurus] on black-cap raspberry in Mississippi; mode of dissemination and means of extermination of Coccidæ.
- 1969. RILEY, C. V. Descriptions of some new *Tortricide*, leaf-rollers. <a href="mailto:</a> <a href="mailto:Acad">Trans. Acad</a>. Sci. St. Louis, May, 1882, v. 4, pp. 316–324. Separate: <a href="mailto:Separate">Separate</a>: <a href="mailto:Se
  - Description of two (2) new genera and thirteen (13) new species of *Tortricidæ*; see the *Systematic Index* for a list of the same; mention of the food-plants of some of the species.
- 1970. RILEY, C. V. Larval habits of bee-flies. <Amer. Nat., June [19 May], 1881, v. 15, pp. 438-447, pl. 6. Separate: <pp. 438-447. Adapted from the 2d Rept. U. S. Ent. Commission, pp. 262-269; see No. 1959 for synopsis of contents.
- 1971. [RILEY, C. V.] The periodical Cicada alias "seventeen-year locust." <Amer. Nat., June [19 May], 1881, v. 15, pp. 479-482, fig. 1. Correction: <Ibid., July [22 June], 1881, p. 578.
  - Extract from 1st Rept. State Ent. Mo., with additional notes; figures eggs, pupæ, and imago of *Cicada* [= *Tibicen*] septendecim, and of twig punctured by the imago for the deposition of her eggs.
- 2972. RILEY, C. V. A new species of oak coccid mistaken for a gall. <a href="#"><Amer. Nat.</a>, June [19 May], 1881, v. 15, p. 482.
  - Description of Kermes galliformis n. sp. [p. 482] occurring on Quercus palustris in the southern and central United States; the coccid infested by Euclemensia bassettella.
- 1973. [RILEY, C. V.] The "water-weevil" of the rice-plant. <Amer. Nat., June [19 May], 1881, v. 15, pp. 482-483. Extract: <Ann. Rept. [U.S.] Commissioner Agric. for 1881 and 1882, pp. 130-133. Note on the injury done to rice plants by the larvæ of Chalepus trachypygus
  - Note on the injury done to rice plants by the larvæ of *Chalepus trachypygus* and by other larvæ, probably *Lissorhoptrus simplex*; letter from J. Screven; seasons, habits, and ravages of the last-mentioned species.
- 1974. [RILEY, C. V.] The impregnated egg of *Phylloxera vastatrix*. <Amer. Nat., June [19 May], 1881, v. 15, pp. 483, 484. Reprint: <Amer. Wine and Grape Grower, 1 July, 1881, v. 3, p. 104. S.-b. No. 42, pp. 12-13.
  - Verification by P. Graell of author's conclusion that the impregnated egg of *Phylloxera vastatrix* would generally be found to hatch in the same season in which it was laid.

- 1975. RILEY, C. V. Works on North American Microlepidoptera. <a href="mailto:American-Microlepidoptera">Amer. Nat., June [19 May], 1881, v. 15, pp. 484-486</a>.
  - Review of works of T. de Grey [Lord Walsingham]; discussion of new genera; list of *Tortricidæ* of economic interest common to Europe and North America; additions to the synonomy of *Tortricidæ*.
- 1976. [RILEY, C. V.] Moths mistaken for *Aletia*. <Amer. Nat., June [19 May], 1881, v. 15, pp. 486-487.
  - Platyhypena [= Hypena] scabra and Phoberia atomaris mistaken for Aletia argillacea [= xylina]; hibernating habits of the first species.
- 1977. [RILEY, C. V.] Specific value of Apatura alicia Edw. < Amer. Nat., June [19 May], 1881, v. 15, p. 487. Critical review of paper by W. H. Edwards.
- 1978. RILEY, C. V. Antigaster vs. Eupelmus. <Ca. Ent., May, 1881, v. 13, p. 114.
  - Validity of L. O. Howard's reasons for considering Antigaster a synonym of Eupelmus.
- 1979. RILEY, C.V. The periodical Cicada alias "seventeen-year locust." <Farmer's Review, 16 June, 1881, v. 6, p. 370. S.-b. No. 42, pp. 18-20.
  - Extract from 1st Rept. State Ent. Mo., with additional notes and request for further information in regard to the chronology and geographical distribution of the broads of Cicada [= Tibicen] septendecim and C. [= T.] tredecim which appear in 1881.
- 1980. [RILEY, C. V.] Dimorphism in *Cynipidw*. <Amer. Nat., July [22 June], 1881, v. 15, p. 566.
  - Claim of author to have made the first record at least in North America of proof of dimorphism in *Cynipidæ*; notice of writings of B. D. Walsh, H. F. Bassett, and H. Adler on the subject; list of species of *Cynipidæ* in which the occurrence of dimorphic forms has been proven, and of closely allied species in which no alternate generation seems to occur.
- 1981. [RILEY, C. V.] Blepharoceridæ. <Amer. Nat., July [22 June], 1881, v. 15, pp. 567-568.
  - Account of various investigations into the natural history of Blepharoceridæ; description of larvæ and pupæ of these flies.
- 1982. [RILEY, C. V.] Braula cæca not particularly injurious to the honey-bee. <Amer Nat., July [22 June], 1881, v. 15, p. 568.

  Notice of paper of J. Fedarb; ravages of Braula cæca in hives generally overestimated at present and formerly unknown.
- 1983. [RILEY, C. V.] Economic entomology in England. <Amer. Nat., July [22 June], 1881, v. 15, p. 568.

  Notice of Miss E. A. Ormerod's report for 1880.
- 1984. [RILEY, C. V.] The cultivation of pyrethrum and manufacture of the powder. <Amer. Nat., 1881, v. 15, July [22 June], pp. 569-572; September [23 August], pp. 744-746; October [23 September], pp. 817-819. See: <Amer. Wine and Grape Grower, December, 1881, v. 4, p. 22. S.-b. No. 51, p. 149.
  - Partial history of the use of pyrethrum powder as an insecticide; directions for the cultivation of the plants and for the production and use of the powder

- 1985. [RILEY, C. V.] Hudson Bay Lepidoptera. <Amer. Nat., July [22 June], 1881, v. 15, pp. 572, 573.
  - Review of paper of J. J. Weir; reprint of the list of Lepidoptera and of the remarks on the explanation of the relations of the fauna of Hudson's Bay to that of Europe; probability that the species identical with those of Europe are recent immigrants.
- 1986. [RILEY, C. V.] Trade in insects. <Amer. Nat., July [22 June], 1881, v. 15, p. 573.
  - General decline in prices of insects within sixty years or more; statement of some prices obtained for Coleoptera recently.
- 1987. [RILEY, C. V.] Ants injurious in Arizona. <Amer. Nat., July [22 June], 1881, v. 15, pp. 573, 574.

Statement by H. H. Rusby of ravages of Formicide, which occur in vast colonies.

- 1988. [RILEY, C. V.] Covering of egg-puncture mistaken for *Dorthesia*. <Amer. Nat., July [22 June], 1881, v. 15, p. 574.
  - Waxy material covering the egg-punctures of Enchophyllum [= Enchenopa] binotata, labeled Dorthesia viburni and D. celastri in collection of A. Fitch.
- 1989. [RILEY, C. V.] [*Dolerus unicolor*.] < Amer. Nat., July [22 June], 1881, v. 15, p. 574.
  - Doubts the statement of H. Keenan that the imagos of *Dolerus unicolor* injure the fruit buds of pear-trees.
- 1990. [RILEY, C. V.] Supposed army-worm in New York and other Eastern States. < Amer. Nat., July [22 June], 1881, v. 15, pp. 574-577.
  - Ravages of Nephelodes violans and Crambus vulgivagellus in New Jersey, Long Island, and northern New York; natural history, vernacular names, and description of the larva of the former species; previous accounts of this larva.
- 1991. [RILEY, C. V.] Migration of butterflies. <Amer. Nat., July [22 June], 1881, v. 15, p. 577.
  - Report by J. H. Mellichamp of the eastward flight of thousands of *Pieris monuste* in small groups of two, three, or more individuals, on 1 and 2 June, 1881, over Bluffton, S. C.; description of larva and pupa; food-plants of larva.
- 1992. [RILEY, C. V.] Classification of the mites. < Amer. Nat., July [22 June], 1881, v. 15, pp. 577-578.
  - Abstract of letter of G. Haller; observations on the appendages and systematic position of the Acarina.
- 1993. [RILEY, C. V.] Carrying out the law. <Amer. Nat., July [22 June], 1881, v. 15, p. 578.
  - A fine of £5 imposed upon a man in England for importing living *Doryphora* decemlineata into that country.
- 1994. RILEY, C. V. Locusts and locusts. <N. Y. Tribune, 22 June, 1881. S.-b. No. 32, pp. 55-56; No. 42, pp. 7-11.
  - Cicada [= Tibicen] septendecim and C. [T.] tredecim compared with Caloptenus spretus to explain and correct the confusion of the species by those who call them all "locusts"; differences in the habits and characters of these

- 1994. RILEY, C. V.—Continued.
  - insects, their periodicity and distribution; no fear that C. spretus will commit great ravages this year; recommendation of a system of observations and warnings by the United States Signal Service to guard against unexpected inroads of C. spretus.
- 1995. RILEY, C. V. The caterpillar nuisance. <Evening Star [Washington, D. C.], 24 June, 1881, v. 57, No. 8802, p. 3. S.-b. No. 23, p. 152; No. 42, p. 13. Reprint: <Amer. Nat., September [23 August], 1881, v. 15, pp. 747-748, 1 fig.
  - Natural history of *Hyphantria textor* [=cunea]; means against it; methods of applying poisoned liquids to trees.
- 1996. RILEY, C. V. Directions for cultivating pyrethrum for insect powder. <a href="#">Gardener's Mo. and Hortic.</a>, June, 1881, v. 23, pp. 172–173. S.-b. No. 23, p. 153.
  - Directions for raising Pyrethrum cinerariæfolium from seed; climate not favorable to the growth of P roseum; preparation of these plants for the destruction of insects.
- 1997. RILEY, C. V. Cotton-worms and Cicadas. Prof. Stelle's logic! <Selma [Ala.] Times, 19 July, 1881. S.-b. No. 24, pp. 44-45; No. 39, p. 123.
  - Criticism of statements of J. P. Stelle; impossibility of exterminating Aletia xylina; waves of destructiveness; Cicada [= Tibicen] tredecim abundant in sections of Alabama, as predicted.
- 1998. RILEY, C. V. The Rocky Mountain locust alias Western grass-hopper. <Amer. Agric., July, 1881, v. 40, pp. 283-284, 6 figs. S.-b. No. 23, p. 142.
  - Summary of facts concerning the egg-laying development, habits, food-plants, destructive powers, migration, flight, and enemies of and means against *Caloptenus spretus*; figures of the eggs of the insect in all stages, of the manner of oviposition, and of pans for the destruction of the locusts; prospects of future injury.
- 1999. RILEY, C. V. Lepidopterological notes. <Papilio, July, 1881, v. 1, pp. 106-110.
  - Advance print of extracts from Bull. No. 6, U. S. Entomological Commission, pp. 56-58, 78, 82-83. See No. 2026 for synopsis of contents.
- 2000. RILEY, C. V. Further notes on the pollination of Yucca and on *Pronuba* and *Prodoxus*. <Proc. Amer. Assoc. Adv. Sci. for 1880, 14 October, 1881, v. 29, pp. 617-639, 16 figs. Separate: <[Salem, Mass, July, 1881], 23 pp., 16 figs.
  - Recapitulation of published observations on Pronuba yuccasella and Prodoxus decipiens, with additional observations and references to literature; habits and functions of the two species; descriptions and figures of the generic characters of Pronuba, Prodoxus, and Hyponomeuta, and of the specific characters of Pronuba yuccasella, P. maculata n. sp., Prodoxus decipiens, P. intermedius n. sp., P. marginatus n. sp., P. cinereus n. sp., P. wnescens n. sp., Hyponomeuta malinella, and H. multipunctella, especially the structure of the ovipositor and the male characters, and the venation of the wings; discussion of the structure of the ovipositor in Lepidoptera characterization of the new family Prodoxida to comprise Pronuba and Prodoxus; generic and specific synonymy; reply to criticism of T. Meehan; list of insects frequenting Yucca; synonymical list of the described Prodoxia.

- 2001. RILEY, C. V. Additional notes on the army worm, Leucania unipuncta. <Proc. Amer. Assoc. Adv. Sci. for 1880 [14 October], 1881, v. 29, pp. 640-642. Separate: <Salem, Mass., July, 1881, pp. 24-26. Abstract: <Boston Daily Advertiser, 2 September, 1880, v. 136, p. 4.
  - Number of annual generations of *Leucania unipuncta*; stages at which hibernation takes place; occasional immigration of moths into uninfested districts; preferred breeding-places; connection of wet and dry seasons with the abundance of these insects.
- 2002. RILEY, C. V. The hitherto unknown life-habits of two genera of bee-flies, *Bombyliidæ*. <Proc. Amer. Assoc. Adv. Sci. for 1880 [14 October], 1881, v. 29, p. 649. Separate: <Salem, Mass., July, 1881, p. 33.
  - Food-animals and food-habits of Systachus oreas and Triodites mus; parallelism in the life-history of Bombyliidw and Meloidw; connection of the abundance of insects of these families in the western United States with the prevalence of Acrididw there; retardation of development in the early stages of these parasites explained as a beneficial characteristic.
- 2003. RILEY, C. V. A remarkable case of retarded development. <Sci. Amer., 20 August, 1881 [v. 59], n. s., v. 45, p. 116. S.-b. No. 23, p. —.
  - Report of a case in which eggs of Caloptenus spretus remained undeveloped for a period of four and one-half years after being laid; remarks upon the problems involved in the explanation of retarded development.
- **2004.** [RILEY, C. V.] Blepharoceridæ. <Amer. Nat., September [23 August], 1881, v. 15, p. 748.
  - Discovery by J. Q. Adams of pupe and images of Blepharoceridæ at Watertown, N. Y.
- 2005. [RILEY, C. V.] Remarkable case of retarded development, <a href="mailto:Amer.Nat.">Amer. Nat.</a>, September [23 August], 1881, v. 15, pp. 748–749.
  - Eggs of Caloptenus spretus, buried about 25 cm. (10 inches) under ground, remained unhatched and alive for four and one-half years, and hatched upon being exhumed.
- 2006. [RILEY, C. V.] Promotion of silk-culture in California. < Amer. Nat., September [23 August], 1881, v. 15, p. 749.
  - Answer to letter of Mrs. T. H. Hittell; popularization of silk-culture in California; preparation of the fiber for the market.
- 2007. [RILEY, C. V.] Locust flights in Dakota. >Amer. Nat., September [23 August], 1881, v. 15, pp. 749-750.
  - Flights of Caloptenus spretus in Dakota on 7th and 16th July, 1881; large numbers of Diplax rubicundula accompanying the locusts.
- 2008. [RILEY, C. V.] The Hessian fly. <Amer. Nat., September [23 August], 1881, v. 15, p. 750.
  - Extensive damages done by Cecidomyia destructor in Illinois and Missouri; its abundance in the western prairie States in 1881.

- 2009. [RILEY, C. V.] The genuine army-worm in the West. < Amer. Nat., September [23 August], 1881, v. 15, p. 750.
  - Occurrence and ravages of Leucania unipuncta in Illinois and Indiana in 1881; these larvæ either from eggs of hibernated moths or of a second brood; other insects mistaken for this in other States; periods of the Leucania and influence of the seasons upon it.
- 2010. [RILEY, C. V.] A new imported enemy to clover. <Amer. Nat., September [23 August], 1881, v. 15, pp. 750-751.

Clover injured by Phytonomus punctatus at Barrington, N. Y., in July, 1881.

- 2011. [RILEY, C. V.] Another enemy of the rice-plant. <Amer. Nat., September [23 August], 1881, v. 15, p. 751.
  - Rice-plants injured by the larva of Laphygma frugiperda in Georgia in the summer of 1881.
- 2012. [RILEY, C. V.] Canker-worms. <Amer. Nat., September [23 August], 1881, v. 15, p. 751.

Excessive ravages of Palcacrita vernata in Tazewell County, Illinois, in 1881.

- 2013. [RILEY, C. V.] Lepidopterological notes. < Amer. Nat., September [23 August], 1881, v. 15, pp. 751-752.
  - Advance extract from Bull. No. 6, U. S. Entomological Commission, pp. 55-56. See No. 2026 for synopsis of contents.
- 2014. RILEY, C. V. The periodical Cicada. <Amer. Agric., August, 1881, v. 40, p. 132, 5 figs. S.-b. No. 23, p. 141.
  - Brief sketch of the natural history of  $Cicada \ [= Tibicen]$  septendecim and C. [= T.] tredecim, with figures of all stages and of punctured twigs; the reputed stinging by these insects probably done by Stizus grandis [= Sphecius speciosus]; figure of the Stizus; recommends the substitution of the name "periodical Cicada" in place of the name "locust."
- 2015. RILEY, C. V. Entomological notes. <Farmer's Review, 22 September, 1881. S.-b. No. 42, pp. 54-55. Reprint: <Amer. Nat., [3] December, 1881, v. 15, pp. 1012-1013. See: <Sci. Amer., 11 February, 1882. S.-b. No. 38, p. 1½.
  - Abstract and critical review of paper by M. Saint-André; attempted explanation of the immunity of grape-vines in sandy soil from the ravages of *Phylloxera vastatrix*.
- 2016. RILEY, C. V. Notes on Hydrophilus triangularis. <Amer. Nat., October [23 September], 1881, v. 15, pp. 814-817, figs. 1-2.
  - Description and figures of egg-case and figures of eggs and of male imago, with structural details of *Hydrophilus triangularis*; characters and life-history of the larva and pupa; figures of eggs, egg-case, larva, and pupa of *H. piceus* of Europe.
- 2017. [RILEY, C. V.] Migration of plant-lice from one plant to another. <a href="#"><Amer. Nat., October [23 September], 1881, v. 15, pp. 819–820.</a>
  - Exposition of J. Lichtenstein's theory that most Aphidide, especially gall-making Pemphigini, live upon two different plants in passing through their cycle of development; cites instances in which the host-plants are of different families.
- 2018. [RILEY, C. V.] The chinch-bug. <Amer. Nat., October [23 September], 1881, v. 15, pp. 820-821.
  - The abundance of *Blissus leucopterus* is connected with the moisture of the season; extraordinary noxiousness of this insect in the dry season of 1881 in various parts of the United States.

- 2019. [RILEY, C. V.] Phylloxera laws. < Amer. Nat., October [23 September], 1881, v. 15, p. 821.
  - Summary of the existing laws regulating the traffic in plants, with a view of preventing the introduction of *Phylloxera vastatrix* into different countries.
- 2020. [RILEY, C. V.] One half the vine area of France affected by Phylloxera. <Amer. Nat., October [23 September], 1881, v. 15, p. 821.
  - Statement that nearly one-fourth of the area of vineyards in France is destroyed by *Phylloxera vastatrix* and as much more attacked; submersion the only sure remedy, and the use of American resisting stocks the only available preventive.
- 2021. [RILEY, C. V.] London purple and Paris green. <Amer. Nat., October [23 September], 1881, v. 15, p. 821.
  - London purple more than twice as efficacious and less expensive than Paris green as an insecticide; it needs to be well ground; composition of London purple.
- 2022. [Riley, C. V.] Entomologist for the Pacific coast. < Amer. Nat., October [23 September], 1881, v. 15, pp. 821–822.
  - Notice of attempts made to have a State entomologist appointed in California.
- 2023. [RILEY, C. V.] Dilar in North America. <Amer. Nat., October [23 September], 1881, v. 15, p. 822.

  Notice of paper by R. McLachlan.
- **2024.** [RILEY, C. V.] Locusts in Nevada. < Amer. Nat., October [23 September], 1881, v. 15, p. 822.
  - Statement from Reno [Nev.] Journal that the countless locusts which hatched in western Nevada in the spring of 1881 flew toward the Sierra Nevada without doing any injury.
- 2025. [RILEY, C. V.] Odor in butterflies. <Amer. Nat., October [23 September], 1881, v. 15, p. 822.

  Notice of paper by Miss M. E. Murtfeldt.
- 2026. RILEY, C. V. General index and supplement to the nine reports on the insects of Missouri. <Bull. No. 6, U.S. Ent. Commission [24 March], 1881, 178 pp.
  - Order of matter: (1) Introduction. (2) Table of contents. (3) Corrections. (4) Notes and additions. (5) Descriptions of new species and varieties. (6) List of descriptions of adolescent states. (7) List of descriptions, mostly amplified, of species not new. (8) List of illustrations by reports. (9) Classified list of illustrations. (10) General index. (11) Index to foodplants.
- 2027. [RILEY, C. V.] The permanent subsection of entomology at the recent meeting of the A. A. A. S. < Amer. Nat., 1881, v. 15, November [28 October], pp. 909-912; [3] December, pp. 1008-1011.
  - Notice of the meeting at Cincinnati, Ohio, August, 1881, with abstracts and notices of papers read.
- 2028. RILEY, C. V. The new imported clover enemy. <Amer. Nat., November [28 October], 1881, v. 15, pp. 912-914.
  - Occurrence and habits of *Phytonomus punctatus* in New York; description of the egg and larva-of the same; food-plants of the European species of *Phytonomus*.

- 2029. RILEY, C. V. Crambus vulgivagellus. <Amer. Nat., November [28 October], 1881, v. 15, pp. 914-915.
  - Excessive abundance of this species in the eastern United States in 1881; description of the egg; method of oviposition.
- 2030. RILEY, C. V. Larval habits of *Sphenophori* that attack corn. <a href="mailto:Amer.Nat."><a href="mailto:Amer.Nat.">Amer.Nat.</a>, November [28 October], 1881, v. 15, pp. 915-916. Several species of *Sphenophorus* injurious to maize-plants in different parts of the United States; habits and ravages of *S. robustus*.
- 2031. [RILEY, C. V.] Effect of drought on the Hessian fly. <Amer. Nat., November [28 October], 1881, v. 15, p. 916. See: <N. E. Farmer, 10 December, 1881. S.-b. No. 45, p. 39. <Farmer's Review, 15 December, 1881. S.-b. No. 45, p. 99.
  - Hot and dry weather dries up and kills  ${\it Cecidomyia\ destructor}$  and its parasites.
- 2032. [RILEY, C. V.] Simulium from Lake Superior. <Amer. Nat., November [28 October], 1881, v. 15, p. 916.
  - Notice of paper by H. A. Hagen; larvæ and pupæ from Lake Superior similar to those of S. pictipes, but the imagos from the same locality are different.
- 2033. [RILEY, C. V.] Coleopterous cave fauna of Kentucky. < Amer. Nat., November [28 October], 1881, v. 15, pp. 916, 917.
  - Notice of H. G. Hubbard's investigations; Adelops contains but one species, which seems to be equally common in all caves in the State; Ancphthalmus contains several species, and more may be expected to be found.
- 2034. [RILEY, C. V.] Hemipterological studies. <Amer. Nat., November [28 October], 1881, v. 15, p. 917.

  Notice of paper of V. Signoret.
- 2035. [RILEY, C. V.] Entomology in Buffalo, N. Y. < Amer. Nat., November [28 October], 1881, v. 15, p. 917.

  Notice of Vol. 4, No. 1, of the Bulletin of the Buffalo Society of Natural Science; list of entomological papers therein.
- 2036. [RILEY, C. V.] Lampyridæ. <Amer. Nat., November [28 October], 1881, v. 15, p. 917.
  Notice of paper by J. L. Leconte.
- 2037. [RILEY, C. V.] Severe cold and hibernating apple-worms. <Amer. Nat., November [28 October], 1881, v. 15, p. 917.
  - According to A. J. Cook larvæ of Carpocapsa pomonella were killed in their cocoons where exposed to the severe cold of the winter of 1880-1881.
- 2038. RILEY, C. V. [Address delivered 4 November, 1881, at the cotton convention held in Atlanta, Ga., 2-4 November, 1881.] <[U. S. Department of Agriculture.] Address of Hon. George B. Loring... and other proceedings of the cotton convention, Washington, 1881, pp. 19-35. Reprint: <Atlanta Constitution, 5 November, 1881. S.-b. No. 24, p. 34.
  - Beneficial and injurious influence of insects; methods of counteracting the same; ravages and natural history of and search for means against Aletia argillacea [=xylina]; improved methods and contrivances for the application of poisons to plants.

- 2039. RILEY, C. V. The chinch bug. <Amer. Agric., November, 1881, v. 40, p. 476, figs. 1-3. S.-b. No. 42, pp. 21-23.
  - Ravages, food-plants, and natural history of *Blissus leucopterus*; descriptions and figures of its several stages and of dimorphic form of the imago; effect of wet weather upon it.
- 2040. [RILEY, C. V.] Retarded development in insects. <Amer. Nat., [3] December, 1881, v. 15, pp. 1007-1008. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1881, [13 October], 1882, v. 30, pp. 270, 271. Notice: <Gardener's Chronicle, 27 May, 1882, v. 17, pp. 708-709. S.-b. No. 42, p. 31.
  - Eggs of Caloptenus spretus retained their vitality four and one-half years under abnormal environment and then hatched on exposure to normal conditions; speculations on the cause of the phenomena of retardation of development.
- 2041. [RILEY, C. V.] Preparation of Diptera. <Amer. Nat., [3] December, 1881, v. 15, p. 1008.

  Notice of paper of J. Mik.
- 2042. [RILEY, C. V.] Another herbivorous ground-beetle. <Amer., Nat., [3] December, 1881, v. 15, p. 1011.

  Anisodactylus confusus injuring strawberry-plants in California.
- 2043. [RILEY, C. V.] A disastrous sheep parasite. <Amer. Nat., [3] December, 1881, v. 15, p. 1011.

  A parasite (*Trichodectes ovis?*) doing great injury to sheep in Illinois.
- 2044. [RILEY, C. V.] Locusts in the West. <Amer. Nat., [3] December, 1881, v. 15, p. 1013.
  - Caloptenus spretus scarce in Colorado and Kansas; Camnula pellucida abundant on the Pacific coast; destructiveness of locusts in many parts of South America and of Pachytylus migratorius in Turkey; means adopted against the latter.
- 2045. [RILEY, C. V.] Structure of the claw in Psocina. <Amer. Nat., [3] December, 1881, v. 15, pp. 1013-1014.

  Notice of paper of H. A. Hagen.
- 2046. [RILEY, C. V.] Insect collection for sale. <Amer. Nat., [3] December, 1881, v. 15, p. 1014.

  Notice of the collection of Coleoptera left by C. Trabrandt.
- 2047. RILEY, C.V. Peach-tree bark-borer. Important note from Prof. C. V. Riley. <Rural New Yorker, 24 December, 1881, v. 40, p.
  - 866. S. b. No. 42, p. 13. Habits and ravages of *Phlwotribus liminaris*; means against bark-borers.
- 2048. RILEY, C. V. The chinch-bug. <Amer. Agric., December, 1881, v. 40, p. 515, figs. 1-4. S.-b. No. 42, pp. 23-26.
  - Figures Anthocoris [= Triphleps] insidiosus and Harpactor [= Milyas] cinctus as enemies of Blissus leucopterus and Nysius destructor [= angustatus] and Piesma cinerea as likely to be confounded with it; mentions other enemies of the chinch-bug; means against it; importance of irrigation.
- 2049. RILEY, C. V. On the oviposition of *Prodoxus decipiens*. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, pp. 62-63. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1881 [13 October],

- 2049. RILEY, C. V.—Continued. 1882, v. 30, p. 272. Separate: <[Salem, Mass., February, 1882],
  - Time and manner of oviposition of Prodoxus decipiens in stem of Yucca filamentosa.
- 2050. [RILEY, C. V.] Clover insects. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, p. 63.

  Notice of paper of J. A. Lintner.
- 2051. RILEY, C. V. Horn's classification of the *Carabidæ*. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, pp. 63-64. Notice of paper of G. H. Horn.
- 2052. [RILEY, C. V.] The butterfly-trees of Monterey again. < Amer Nat., January, 1882 [30 December, 1881], v. 16, p. 64.

  Swarming and migrating habits of Danais archippus; hibernation of the
- 2053. [RILEY, C. V.] Interest felt in economic entomology in California. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, p. 65.
  - Notice of a call issued by the Board of State Horticultural Commissioners of California for a State convention to consider horticultural subjects, including means against insects.
- 2054. [RILEY, C. V.] Obituary. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, p. 65.

  Biographical notice of J. D. Putnam; announcement of the death of G. V. Mniszech.
- 2055. RILEY, C. V. New insects injurious to agriculture. <Amer. Nat., February [25 January], 1882, v. 16, pp. 151-152. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1881, [13 October], 1882, v. 30, pp. 272-273.
  - The occurrence of previously unnoticed noxious insects due to, 1, the introduction of species from abroad; 2, previously existing unnoticed species; and 3, the acquisition of new habits by previously known innoxious species; in the last case the acquisition of new habits may be accompanied by the acquisition of new descriptional character, thus constituting a new species; new species thus become developed within brief periods of time.
- 2056. [RILEY, C. V.] New entomological periodicals. <Amer. Nat., February [25 January], 1882, v. 16, pp. 152–153. Notice of several prospective periodicals.
- 2057. [RILEY, C. V.] Locust probabilities for 1882. <Amer. Nat., February [25 January], 1882, v. 16, p. 153. Favorable prospects of immunity from ravages of Caloptenus spretus in 1882.
- 2058. [Riley, C. V.] Entomological notes. <Amer. Nat., February [25 January], 1882, v. 16, p. 153.
  - Notice of J. J. Weir's paper on the "Lepidoptera of the Outer Hebrides," etc.
- 2059. [RILEY, C. V.] Bibliography of gall literature. <Amer. Nat., March [24 February], 1882, v. 16, pp. 246-247.
  Notice of the record of F. Thomas,

- 2060. RILEY, C. V. A new depredator infesting wheat-stalks. < Amer. Nat., March [24 February], 1882, v. 16, pp. 247-248, fig. 1.
  - Isosoma allynii French is a species of Eupelmus probably parasitic on some of the wheat-stalk feeders and on some species of Chlorops; habits and figures of larva and description of female image of Isosoma tritici [p. 247]; comparisons between I. tritici and I. hordei; alleged habits of I. lineare of Europe; relative conspicuousness of the "humeral spot" in European, American, and Australian species of Isosoma. See No. 2063.
- 2061. RILEY, C. V. Further notes on the imported clover-leaf weevil (*Phytonomus punctatus*). <Amer. Nat., March [24 February], 1882, v. 16, pp. 248, 249.
  - Identity of *Phytonomus opimus* Lec. with *P. punctatus* Fab.; instances in which injurious insects have been overlooked for a long time; probability that plant-feeding Coleoptera imported from Europe will not spread far from the Atlantic coast; some species, injurious in Europe, are thus far innoxious in America; hibernation of and means against *P. punctatus*.
- 2062. [RILEY, C. V.] Silk-worm eggs; prices and where obtained. <Amer. Nat., March [24 February], 1882, v. 16, pp. 249-250.
  - Sources from which eggs of Sericaria mori can be obtained in the United States for purposes of silk-culture; prices at which eggs are sold by Crozier & Co.
- 2063. RILEY, C. V. The wheat *Isosoma*. A new depredator infesting wheat-stalks. <Rural New Yorker, 4 March, 1882. S.-b. No. 42, pp. 55-56. See: <Sci. Amer. Suppl., 17 June, 1882. S.-b. No. 37, p. 57.
  - Description of female imago of *Isosoma tritici*; habits, ravages, and distribution of and means against the same; comparison with related species; a probable parasite of it, described as *Isosoma allynii* by G. H. French, belongs to the genus *Eupelmus*. See No. 2060.
- 2064. RILEY, C. V. Possible food-plants for the cotton-worm. < Amer. Nat., April [22 March, 1882], v. 16, pp. 327-329. Reprint: < Rept. [U. S.] Com. Agric. for 1881 and 1882, 1882 [January, 1883], pp. 164-166. Separate: < pp. 164-166.
  - Food-plants of Aletia xylina. See No. 2119 for synopsis of contents.
- 2065. [RILEY, C.V.] Mode of feeding on the larva of *Dytiscus*. <Amer. Nat., April [22 March], 1882, v. 16, p. 330.
  - Notice of paper of E. Burgess; structure of the mouth of the larva of *Dytiscus*; manner in which this larva feeds.
- 2066. [Riley, C. V.] Entomological notes. <Amer. Nat., April [22 March], 1882, v. 16, p. 330.
  - Brief notices of several articles recently published with items of news.
- 2067. [RILEY, C. V.] Riley's researches. Orange insects and the cottonworm; how the orange insect operates and the cure for its ravages; the hibernation of the cotton-worm; settlement of a mooted question. <Florida Daily Times, 29 March, 1882. S.-b. No. 42, pp. 28-29.
  - Report of interview with C. V. Riley; discovery by W. H. Ashmead that "orange rust" is caused by a mite; habits of and means against the same;

- 2067. RILEY, C. V.—Continued.
  - successful application by H. G. Hubbard of an emulsion of kerosene and milk as a means against this mite and against scale-insects; proof of the hibernation of Aletia argillaeea [=xylina] in the extreme south of the United States; means against the Aletia.
- 2068. RILEY, C. V. Prof. C. V. Riley and the Yucca moth. < Gardener's Mo. and Hortic., March, 1882, v. 24, p. 92. S.-b. No. 23, pp. 198-199.
  - Critical review and reply to editorial of T. Meehan.
- 2069. RILEY, C.V. The *Noctuidæ* in the Missouri entomological reports. <a href="#Papilio">< Papilio</a>, March, 1882, v. 2, pp. 41-44. Separate: <N. Y., 1882, 4 pp.
  - Critical review of paper of A. R. Grote; discussion of the synonymy of the *Noctuidæ* in the Missouri entomological reports.
- 2070. Riley, C. V. Silk-culture in the United States. <Sci. Amer., 1 April, 1882 [v. 60], n. s., v. 46, p. 193. S.-b. No. 42, pp. 93-96.
  - Statement of the dangers to be avoided and the obstacles to be overcome for the successful establishment of silk-culture in the United States.
- 2071. RILEY, C. V. Little known facts about well known animals. A lecture delivered in the National Museum, Washington, D. C., April 8, 1882. < Washington, April, 1882, 32 pp., figs. See: < National Farmer, 13 July, 1882. S.-b. No. 42, p. 15. < Prairie Farmer, 22 July, 1882. S.-b. No. 46, p. 99.
  - The entomological subjects include brief and popular illustrated accounts of the life-histories and transformations of the house-fly (Musca domestica) and mosquito (Culex pipuens); the development of Trombidium from Astoma; parasitism; truth of the theory of evolution; reasons for the prevalent ignorance of natural history; interest and value of a knowledge of natural history.
- 2072. RILEY, C. V. Lichtenstein's theory as to dimorphic asexual females. <Amer. Nat., May [24 April], 1882, v. 16, p. 409.
  - Criticism of J. Lichtenstein's theory that winged female Aphidida and asexual female Cynipida are larva, and their eggs pupa; errors in the comparison of these forms with the hypermetamorphotic stages of Meloida.
- 2073. [RILEY, C. V.] Naphthaline cones for the protection of insect collections. <Amer. Nat., May [24 April], 1882, v. 16, pp. 409-410.
  - Use of and objections to the use of naphthaline cones; formula of a preferable protective mixture.
- 2074. [RILEY, C. V.] Injurious insects in California. <Amer. Nat., May [24 April], 1882, v. 16, p. 410.
  - Notice of treatise of Matthew Cooke.
- 2075. [RILEY, C. V.] Sarcophaga lineata destructive to locusts in the Dardanelles. <Amer. Nat., May [24 April], 1882, v. 16, pp. 410-411.
  - Notice of communications, by F. Calvert, regarding the parasitic habits of Sareophaga lineata, which preys upon Œdipoda eruciata; egg-pods of the same locust destroyed by larvæ of Callostoma fascipennis.

- 2076. [RILEY, C. V.] Parasitic Diptera. <Amer. Nat., May [24 April], 1882, v. 16, p. 411.
  - Dilophus parasitic in larvæ of Chætoptria hypericana; the Bibionidæ have hitherto been known only as vegetable feeders in the larval state.
- 2077. RILEY, C. V. The cotton-worm. <Times-Democrat [New Orleans], 7 May 1882, v. —, p. 4. S.-b. No. 42, pp. 29–31; 112–113; No. 63, pp. 47–48. Reprint: <Rept. [U. S.] Com. Agric. for 1881 and 1882, 1882 [January, 1883], pp. 157–159. Separate: <p>< 97–99.</p>

See No. 2119 for synopsis of contents.

- 2078. RILEY, C. V. The house-fly. <Prairie Farmer, 13 May, 1882. S.-b. No. 39, p. 122. See: <Colman's Rural World, 15 June, 1882. S.-b. No. 68, p. 194. <Times-Democrat [New Orleans], 24 June, 1882. S.-b. No. 42, p. 31. <N. E. Farmer, 5 August, 1882.
  - Wide distribution of *Musca domestica*; identity of *M. harpyia* with the species; description of eggs; habits, transformations, and hibernation.
- 2079. RILEY, C. V. Habits of *Cybocephalus*. <Amer. Nat., June [20 May], 1882, v. 16, p. 514.
  - Cybocephalus nigritulus feeds on scales of Chionaspis pinifolii on Pinus elliottii in South Carolina, and C. californicus on a scale on apple-trees in California.
- 2080. [RILEY, C. V.] One effect of the Mississippi floods. <Amer. Nat., June [20 May], 1882, v. 16, pp. 514, 515.
  - Probability that Ligyrus rugiceps will have been drowned out of the region submerged for months by the Mississippi River; liability of the importation of new foes with new seed-plants.
- 2081. [RILEY, C. V.] Doryphora decemlineata in England. < Amer. Nat., June [20 May], 1882, v. 16, p. 515.
  - A living specimen carried from North America to London, England, in a barrel of potatoes.
- 2082. [RILEY, C. V.] Dr. Dimmock's inaugural dissertation. < Amer. Nat., June [20 May], 1882, v. 16, p. 515.
  - Review of G. Dimmock's paper on "The anatomy of the mouth-parts and of the sucking apparatus of some Diptera."
- 2083. [RILEY, C. V.] The triungulin of *Meloidæ*. <Amer. Nat., June [20 May], 1882, v. 16, p. 515.
  - The triungulin of Meloe proscarabæus was described by J. L. Frisch in 1727.
- 2084. [RILEY, C. V.] Fossil tineids. <Amer. Nat., June [20 May], 1882, v. 16, p. 515.
  - Notice of paper of V. T. Chambers; occurrence of the supposed burrow of a tineid larva in a fossil leaf of Acer sp.
- 2085. [RILEY, C. V.] Classification of North American Coleoptera. <a href="#"><Amer. Nat., June [20 May], 1882, v. 16, pp. 515-516.</a>
  - Notice of the approaching completion of the classification of the Coleoptera of North America by J. L. Leconte and G. H. Horn.

- 2086. RILEY, C. V. Hibernation of the army-worm. <Amer. Nat., June [20 May], 1882, v. 16, p. 516.
  - Confirmation of views in regard to the hibernation of the larvæ of *Leucania unipuncta*; places of oviposition; prospects of extensive injury by these insects in the more northern States in 1882.
- 2087. RILEY, C. V. Chinch-bug and army-worm prospects. <Rural New Yorker, 27 May, 1882. S.-b. No. 61, p. 27.
  - Blissus leucopterus abundant in dry weather; Leucania unipuncta in wet weather; the latter hibernates principally as a larva; its eggs secreted in old grass and stubble; means against L. unipuncta.
- 2088. RILEY, C. V. Successful management of the insects most destructive to the orange. <Sci. Amer., 27 May, 1882 [v. 60], n. s., v. 46, pp. 335-336, 5 figs.
  - Treats of *Coccidw* injurious to the orange; means against the same; use of kerosene emulsion; figures stages of *Mytilaspis pomicorticis* [=pomorum], *M. gloveri*, and *M. citricola*.
- 2089. RILEY, C. V. The utilization of ants in horticulture. <Nature, 8 June, 1882, v. 26, p. 126. Reprint: <Gardener's Chronicle, 17 June, 1882, v. 17, p. 805. S.-b. No. 42, p. 32.
  - Abstract of paper of C. J. Macgowan; capture and sale of two species of ants which build nests in trees; colonization of these ants in orange orchards to destroy injurious insects.
- 2090. RILEY, C. V. The army-worm vs. the clover hay-worm. Remedies for the army-worm. <Rural New Yorker, 10 June, 1882.</li>
  S.-b. No. 47, pp. 158-159; No. 61, pp. 32-33. Reprint: <Nat. Farmer, 22 June, 1882.</li>
  S.-b. No. 37, p. 123. <Lancaster Farmer, July, 1882.</li>
  S.-b. No. 46, p. 104. <Home and Farm, 1 July, 1882.</li>
  S.-b. No. 37, p. 122.
  - Abundance of Leucania unipuncta and Asopia costalis in Alabama and Tennessee; confusion of the army-worm with the clover hay-worm; prevalence of enemies of and means against the former.
- 2091. RILEY, C. V. Repelling insects by malodorants. <Amer. Nat., July [22 June], 1882, v. 16, p. 596.
  - Critical review of paper of J. A. Lintner; odorous substances repel insects more by their toxic properties than by their odor; failure of attempts by the use of strongly smelling substances to prevent oviposition; sight, touch, and taste generally more important in insect economy than smell.
- 2092. [RILEY, C. V.] Habits of *Bittacus apterus*. <Amer. Nat., July [22 June], 1882, v. 16, pp. 596–597.
  - Notice of paper of C. R. Osten Sacken; locomotion and food-habits of Bittacus apterus in California.
- 2093. RILEY, C. V. Habits of Coscinoptera dominicana. <Amer. Nat. July [22 June], 1882, v. 16, p. 598.
  - Discovery by F. H. King that Coscinoptera dominicana is inquilinous in ants' nests in its earlier stages; similar habits of related species.
- 2094. [RILEY, C. V.] Sun-spots and insect life. <Amer. Nat., July [22 June], 1882, v. 16, pp. 598–599.
  - Review of paper of A. H. Swinton; dependence of certain insect phenomena on the periods of sun-spots, through the determination by the latter of meteorological conditions.

- 2095. RILEY, C. V. The silk-worm. No. 1-3. < National Farmer, 13, 20, 27 July, 1882. S.-b. No. 35, p. 15; No. 48, pp. 32, 49.
  - Nature of the silk-worm; stages, enemies, diseases, races; wintering and hatching of eggs; feeding and rearing of larvæ; the cocoons; spinning and gathering, choking chrysalids; egg-laying, reproduction, reeling, foodplants.
- 2096. RILEY, C. V. Change of habit; two new enemies of the eggplant. <Amer. Nat., August [28 July], 1882, v. 16, pp. 678– 679.
  - Sudden acquisition by Doryphora juncta and by Cassida texana of the habits of feeding on Solanum melongena, these species having been found previously on S. carolinense and S. elwagnifolium respectively; occurrence of C. texana on S. carolinense; distribution of the two insects.
- 2097. RILEY, C. V. Notes on *Microgasters*. <Amer. Nat., August [28 July], 1882, v. 16, pp. 679-680.
  - Critical review of paper of A. S. Packard; synomymical notes on Packard's species.
- 2098. [RILEY, C. V.] Are honey-bees carnivorous? <Amer. Nat., August [28 July], 1882, v. 16, p. 681.
  - Observations of Fritz Müller on the carnivorous habits of Brazilian Apidæ.
- 2099. [RILEY, C. V.] The "overflow bugs" in California. <Amer.
  Nat., August [28 July], 1882, v. 16, pp. 681-682.
  - Extract from letter of Mrs. A. E. Bush, with introductory remarks; occurrence of *Platynus maculicollis* in such abundance as to become a nuisance.
- 2100. [RILEY, C. V.] Insects and drouth. <Amer. Nat., September [24 August], 1882, v. 16, p. 745.
  - Occurrence of excessive drouth in the spring and early summer of 1880 in New England; statement by S. Lockwood of the exceptional abundance of several insects in New Jersey in that year.
- 2101. RILEY, C. V. Probable sound organs in sphingid pupæ. <Amer. Nat., September [24 August], 1882, v. 16, pp. 745-746.
  - Occurrence of a peculiar structure on the abdominal joints of the pupæ of certain Sphingidæ; genera in which this structure is observed; probable connection of this structure with the function of producing sound as observed in Sphinx atropos.
- 2102. RILEY, C. V. Is Cyrtoneura a parasite or a scavenger? < Amer. Nat., September [24 August], 1882, v. 16, pp. 746–747.
  - Cyrtoneura stabulans bred from pupe of Alctia argillacea [=xylina] usual food of this species; doubt whether the species is a parasite or is only a scavenger in decayed pupe; Phora aletia merely a scavenger; great liability of pupe of Aletia to decay
- 2103. [RILEY, C. V.] Habits of Polycaon confertus Lec. < Amer. Nat., September [24 August], 1882, v. 16, p. 747.
  - Polycaon confertus bores in twigs of apple- and pear-trees and grape-vines; the larvæ probably live in the dead and dry wood of forest-trees.
- 2104. RILEY, C. V. Dinoderus pusillus as a museum pest. < Amer. Nat., September [24 August], 1882, v. 16, p. 747.
  - Dinoderus pusillus feeds on cork and paper lining in an insect box; they occur usually in drugs and other stored and dry vegetal products.

- 2105. RILEY, C. V. Myrmecophilous Coleoptera. <Amer. Nat., September [24 August], 1882, v. 16, pp. 747-748.
  - Larvæ and images of Euphoria hirtipes live in hills of Formica rufa; pupæ of Hymenorus rufipes in nests of Formica fusca and of H. obscurus in nests of another species of ant; known myrmecophilous habits of Cetonia, Cremastochilus, Euparia castanea (in nests of Solenopsis xyloni [= geminata]), Tenebrionidæ, and Anthicus.
- 2106. [RILEY, C. V.] Discontinuance of publication. <Amer. Nat., September [24 August], 1882, v. 16, p. 748.
  - Announcement of the discontinuance of publication of "Revue Coléoptérologique;" critical review of the same.
- 2107. RILEY, C. V. Buffalo tree-hopper injurious to potatoes. <Amer. Nat., October [28 September], 1882, v. 15, p. 823. Habits, food-plants, and ravages of Ceresa bubalus.
- 2108. [RILEY, C. V.] Moths attracted by falling water. <Amer. Nat., October [28 September], 1882, v. 16, p. 826.

  Notice of paper of J. S. Gardner; gleaming water-falls in Iceland as attractive to moths as artificial light would be.
- 2109. [RILEY, C. V.] A new museum pest. <Amer. Nat., October [28 September], 1882, v. 16, p. 826. Reprint: <Psyche, September-October, 1882 [1 March, 1884], v. 3, p. 408.

  \*Perimegatoma variegatum as a pest in collections of insects.
- 2110. [RILEY, C. V.] Fleas feeding on lepidopterous larvæ. <Amer. Nat., October [28 September], 1882, v., 16, p. 826.

  Notice of paper of C. J. Boden; abundance of fleas (*Pulex* sp.) where few or no warm-blooded animals occur may be explained by the feeding of the fleas on insects.
- 2111. [RILEY, C. V.] [Gasteracantha cancer.] < Gonzales [Tex.] Inquirer, 30 September, 1882. S.-b. No. 42, p. 15.

  Habits of Gasteracantha cancer; the male unknown.
- 2112. RILEY, C. V. Cicada septendecim. < Gardener's Mo. and Hortic., September, 1882, v. 24, pp. 274–275. S.-b. No. 38, p. 42; No. 39, p. 6; No. 42, pp. 2–4.
  - Orthography of the names C. [= Tibicen] septendecim and C. [= T.] tredecim; natural relations of the same; indistinguishability of the species of certain genera; dimorphic forms more numerous than usually recognized;  $Massospora\ cicadina\ parasitic\ on\ Cicada.$
- 2113. RILEY, C. V. Remarkable felting caused by a beetle. <Rural New-Yorker, 14 October, 1882, v. 41, pp. 699–700. S.-b. No. 42, p. 16. Reprint, with changes: <Amer. Nat. [2] December, 1882, v. 16, pp. 1018–1019.
  - Description of the felting of the interior of a pillow-ticking with fragments of feathers formed by the ravages of *Attagenus megatoma* within a feather pillow.
- 2114. RILEY, C. V. The buckeye-leaf stem-borer. <Amer. Nat., November [28 October], 1882, v. 16, pp. 913-914. See: <Sci. Amer. Suppl., 16 December, 1882. S.-b. No. 47, p. 145.
  - Sericoris instrutana †Claypole = S. [= Steganoptycha] claypoleana n. sp.; habits and food-plants of this species and of Proteoteras asculana; distinctions between these two species.

- 2115. [RILEY, C. V.] Efficacy of chalcid egg-parasites. < Amer. Nat., November [28 October], 1882, v. 16, pp. 914-915. See: < Prairie Farmer, 2 December, 1882. S.-b. No. 60, p. 123.
  - Beneficial influence and occasional vast abundance of egg-parasitic Chalcididæ and especially of Trichogramma pretiosa and of Telenomus sp.
- 2116. [RILEY, C. V.] On the biology of Gonatopus pilosus Thoms. <Amer. Nat., November [28 October], 1882, v. 16, p. 915.
  - Notice of paper of J. Mik; parasitism of Gonatopus pedestris on Athysanus maritima, and of G. pilosus on Deltocephalus xanthoncurus; transformations and habits of G. pilosus; probable parasitism of a Gonatopus (G. contortulus?) on Amphiscepa bivittata.
- 2117. RILEY, C. V. Species of *Otiorhynchidæ* injurious to cultivated plants. <Amer. Nat., November [28 October], 1882, v. 16, pp. 915-916. See: <Sci. Amer. Suppl., 16 December, 1882. S.-b. No. 47, p. 145.
  - Aramigus fulleri the only species of North American Otiorhynchidæ whose development and earlier stages are known; food-plants of several species; discovery by G. P. Peffer of the injuries of Anametis grisea upon roots of apple- and pear-trees.
- 2118. [RILEY, C. V.] Bombyliid larvæ destroying locust eggs in Asia Minor. <Amer. Nat., November [28 October], 1882, v. 16, pp. 916-917.
  - Notice of and extract from communications of F. Calvert; parasitic habits of Callostoma fascipennis; similarity of habits of Bombyliidæ in Asia and in North America; probability that the larvæ of Cantharis vesicatoria and of other Meloidæ will be found to feed on eggs of Aerididæ.

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2119. RILEY, C. V. Report of the Entomologist. <Ann. Rept. [U. S.]

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| Nat., [2] December, 1882, v. 16, pp. 1014-1015.   |             |
| Extract from Rept. [U. S.] Commis. Agric, for 1881 and 1882, pp. 134  |             |
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- 2121. [RILEY, C.V.] A butterfly larva injurious to pine-trees. < Amer. Nat., [2] December, 1882, v. 16, pp. 1015–1016.
  - Habits and ravages of *Pieris menapia* on yellow-pine and tamarack in Washington Territory.
- 2122. [RILEY, C. V.] The army-worm in 1882. <Amer. Nat., [2] December, 1882, v. 16, p. 1017.
  - Occurrence of *Leucania unipuncta* in great abundance and with disastrous effects, especially in southern United States in 1882.
- 2123. [RILEY, C. V.] The wheat-stalk worm on the Pacific coast. <Amer. Nat., [2] December, 1882, v. 16, pp. 1017–1018.
  - Isosoma tritici injuring wheat-stalks in Washington Territory; reference to prior notices of this insect.
- 2124. [RILEY, C. V.] Deserved honor. <Amer. Nat., [2] December, 1882, v. 16, p. 1018.
  - Notice of the appointment of Eleanor A. Ormerod to be consulting entomologist to the Royal Agricultural Society of Great Britain.
- 2125. [RILEY, C. V.] Important work on *Cynipidw*. <Amer. Nat., [2] December, 1882, v. 16, p. 1018.
  - Notice of G. Mayr's "Die europäischen Arten der gallenbewohnenden Cynipiden."
- 2126. RILEY, C. V. Emulsions of petroleum and their value as insecticides. <Rural New Yorker, 9 December, 1882, v. 41, pp. 833, 834. S.-b. No. 42, pp. 17-18.
  - Results of experiments made upon methods of using petroleum as an insecticide without injury to plants; soap and milk emulsions the most available; methods of preparing the same.
- 2127. RILEY, C. V. The bean-weevil. <Rural New Yorker, 9 December, 1882, v. 41, p. 835. S.-b. No. 42, p. 18.
  - Answer to inquiry of R. J. B.; habits of and means against Bruchus fabæ.
- 2128. RILEY, C. V. The "cluster-fly." < Prairie Farmer, 23 December, 1882, v. 54, p. 7. S.-b. No. 42, pp. 16-17. Reprint: < Amer. Nat., [5] January, 1883, v. 17, pp. 82-83.
  - Habits and synonymy of *Pollenia rudis*; notice of other accounts of the swarming of Diptera. See No. 2174.
- 2129. RILEY, C. V. Darwin's work in entomology. <Proc. Biol. Soc. Wash., 1882, v. 1, pp. 70–80.
  - Analysis of the interest shown by C. R. Darwin in entomology and of his contributions to the same.
- 2130. RILEY, C. V. The cotton-worm. < Western Farmer's Almanac for 1883, 1882, p. 40. S.-b. No. 42, p. 71.
  - Various theories hitherto held in regard to the hibernation of Aletia argillacea [=xylina]; proof of its hibernation; seasons and conditions of development of the first broad of the year, precautionary measures to be adopted.
- 2131. RILEY, C. V. Pyretbrum, an important insecticide. <Western Farmer's Almanac for 1883, 1882, pp. 41–42. S.-b. No. 42, p. 49. See: <Prairie Farmer, 27 January, 1883. S.-b. No. 42, pp. 56–58.
  - Condensed account of the history of the use of pyrethrum flowers as an insecticide; cultivation of the plants and preparation of the powder; methods of its application; experiments in the cultivation of the plants.

- 2132. [RILEY, C. V.] New lists of North American Lepidoptera. <a href="#"><Amer. Nat., [5] January, 1883, v. 17, pp. 80–82.</a>
  - Reviews of lists of Brooklyn Entomological Society, of C. H. Fernald and A. R. Grote.
- 2133. [RILEY, C. V.] Naphthaline cones. <Amer. Nat., [5] January, 1883, v. 17, pp. 83, 84.
  - The cones stain the paper lining of boxes; they seem to destroy mites and Psoci very soon, but have little effect on Dermestide.
- 2134. RILEY, C. V. Emulsions of petroleum as insecticides. <Sci. Amer., 6 January, 1883 [v. 62], n. s., v. 48, p. 3. S.-b., No. 42, pp. 4-7.
  - Notice of experiments made, under author's direction, in 1882, in the use of emulsions of kerosene oil; report of H. G. Hubbard upon experiments made by him; critical review of S. F. Chapin's "Scale insects on deciduous and ornamental trees;" effect of pure kerosene, of emulsions, and of lye upon trees
- 2135. RILEY, C. V. Entomological notes. <Rural New Yorker, 13 January, 1883. S. b. No. 42, p. 78. See: <Amer. Nat., 1883, v. 17, pp. 198–199.
  - 1. A new enemy to wax-beans; extract from letter of G. H. Stone, on the food-plants, habits, and ravages of *Epilachna corrupta*; distribution of the same. 2. Spread of the 12-punctured asparagus beetle; increasing noxiousness of *Crioceris* 12-punctata recorded from near Baltimore, Md., by O. Lugger; comparative description of this species with C. asparagi. 3. An internal mite in fowls; presence of Cytoleichus sarcoptoides in lungs and other parts of diseased chickens.
- 2136. [RILEY, C. V.] The "lignified snake of Brazil." <Evening Star [Washington, D. C.], 20 January, 1883, v. 61, p. 2. S.-b. No. 42, pp. 59-60. Reprint: <Sci. Amer. Suppl., 17 February, 1883. See: <Science, 23 February, 1883, v. 1, p. 84.
  - Discussion of a specimen of problematical character, supposed to be the burrow of a larva under bark; notice of writings upon the subject; frequency with which the true nature of natural objects is mistaken; letter from J. H. Hutchins accompanying a gall of Cecidomyia vitis-pomum mistaken for a hybrid fruit.
- 2137. RILEY, C. V. Utilization of ants in horticulture. <Sci. Amer., 27 January, 1883 [v. 62], n. s., v. 48, p. 49. S.-b., No. 42, pp. 65-66.
  - Abstracts of papers of C. J. Macgowan and H. C. McCook, with additional notes; the introduction of ants might involve objectionable consequences; probability that they would not be of service against *Coccida*.
- 2138. RILEY, C. V. Natural sugaring. <Amer. Nat., February [31 January], 1883, v. 17, pp. 197–198. Reprint: <Country Gentl., 31 May, 1883, v. 48. S.-b. No. 42a, p. 297.
  - Lachnus platanicola n. sp. [p. 198], abundant in 1882 on sycamore trees; description of the species; attraction of great numbers of insects to its saccharine exudations, and growth of Fumayo salicina upon these exudations.
- 2139. [RILEY, C. V.] Trogoderma tarsale as a museum pest. < Amer. Nat., February [31 January], 1883, v. 17, p. 199.
  - Notice of paper of F. H. Snow; remarks on the abundance and ravages of Trogoderma tarsale; habits of its larva.

- 2140. [RILEY, C. V.] Phylloxera in California. <Amer. Nat., February [31 January], 1883, v. 17, pp. 199–200.

  Phylloxera vastatrix in California is most injurious in moist soils.
- 2141. RILEY, C. V. The hibernation of *Aletia xylina* [Say] in the United States a settled fact. <Sci. Amer., 3 February, 1883, v. 48, p. 68. S.-b. No. 42, pp. 66-67. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1882, 1883, v. 31, pp. 468-469. Separate: <Salem, Mass., July, 1883, pp. 468-469. Abstract: <Amer. Nat., April [15 March], 1883, v. 17, pp. 420-421. <Nature, 28 December, 1882, v. 27, p. 214.
  - Proof of the hibernation of Aletia xylina as a moth and of the perpetual existence of the species in Florida.
- 2142. [RILEY, C. V.] Fostering the study of economic entomology. <Rural New-Yorker, 12 February, 1883. S.-b. No. 42, p. 58. Reprint: <Amer. Nat., April [15 March], 1883, v. 17, p. 420. Efforts of the French for the promotion of economic entomology.
- 2143. [RILEY, C.V.] Diseases of the chinch-bug. <Rural New-Yorker, 17 February, 1883. S.-b. No. 42, p. 58.

  Note concerning paper of S. A. Forbes on two fungus parasites of Blissus leucopterus.
- 2144. R[ILEY], C. V. [Instinct of Cicada [= Tibicen] septendecim.]

  <a href="mailto:Amer.Nat.">Amer. Nat.</a>, March [21 February], 1883, v. 17, p. 322.

  Remarks on note of E. W. Claypole; sense of direction in insects.
- 2145. [RILEY, C. V.] Food-habits of Megilla maculata. <Amer. Nat., March [21 February], 1883, v. 17, pp. 322-323.

  Summary of S. A. Forbes' observations upon the food of Megilla maculata; results of other observations on this subject.
- 2146. [RILEY, C. V.] Clothes-moths observed in the United States. <Amer. Nat., March [21 February], 1883, v. 17, p. 323.

  Notice of paper by C. H. Fernald.
- 2147. RILEY, U. V. Entomological notes. <Rural New Yorker, 27 February, 1883. S.-b. No. 42, p. 58. See: <Amer. Nat., April [15 March], 1883, v. 17, pp. 419-420.
  - Abstract of the rules of the international convention at Berne for the prevention of *Phylloxera* ravages; their adoption by Belgium.
- 2148. RILEY, C. V. Notice of an illustrated essay on the *Noctuidæ* of North America. <Bull. Brooklyn Ent. Soc., February, 1883, v. 5, pp. 77-79. Separate: <[Brooklyn, N. Y., 1883], 4 pp. Critical review of A. R. Grotc's essay.
- 2149. RILEY, C. V. Concerning canker-worms. <Indiana Farmer, 3
  March, 1883. S.-b. No. 56, p. 69. <Prairie Farmer, 3 March,
  1883. S.-b. No. 56, p. 69. <Pacific Rural Press, 10 March,
  1883. S.-b. No. 54, p. 15. <Lancaster Farmer, March, 1883.
  S.-b. No. 56, p. 72. <Gardener's Mo. and Hortic., April, 1883,
  v. 25. S.-b.No. 42a, p. 631.
  - Description of Paleacrita vernata and Anisopteryx pometaria; ravages of the former; request for information; method of observation.

- 2150. RILEY, C. V. Dipterous enemies of the *Phylloxera vastatrix*. <Ca. Ent., February [9 March], 1883, v. 15, p. 39.
  - Critical review of paper of T. W. Fyles; the characters given of *Diplosis grassator* are insufficient to distinguish the species; galls of *Phylloxera vastatrix* inhabited by *Leucopis phylloxera* Riley MS.; comparison of the early stages of these two Diptera.
- 2151. [RILEY, C. V.] The food relations of the Carabidæ and Coccinellidæ. <Amer. Nat., April [15 March], 1883, v. 17, pp. 417-419.

  Summary of S. A. Forbes's observations on the food relations of the Carabidæ and Coccinellidæ.
- 2152. [RILEY, C. V.] Relations of the Carabidae and Coccinellidae to birds. <Amer. Nat., April [15 March], 1883, v. 17, p. 419.
  - Reprint of S. A. Forbes's summary, with note; Coccinellide not eaten by birds; Carabide caten in proportion as they have phytophagous habits.
- 2153. [RILEY, C. V.] Viviparity in a moth. <Amer. Nat., April [15 March], 1883, v. 17, p. 420.

  Notes Fritz Müller's discovery of a moth seen to deposit living larvæ.
- 2154. [RILEY, C. V.] Damage to silver-plate by insects. <Amer. Nat., April [15 March], 1883, v. 17, p. 420.

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- 2155. RILEY, C. V. Possible food-plants of the cotton-worm. < Amer. Nat., April [15 March], 1883, v. 17, pp. 421-422.
  - Notice of paper of J. S. Bailey; occurrence of newly issued images of Aletia xylina at Karner, N. Y., 7 and 8 October, 1882, proving that the larva of this insect feeds upon some genus of plants other than Gossypium.
- 2156. [RILEY, C. V.] Agrotis messoria Harr. vs. Agrotis scandens Riley. <Amer. Nat., April [15 March], 1883, v. 17, p. 422, 2 figs.
  - Critical review of views of A. R. Grote; Agrotis lycarum, A. repentis, and A. cochranii = A. messoria; A. scandens is a distinct species; comparison of the imagos; figures larvæ and imagos of the two species.
- 2157. [RILEY, C. V.] An internal mite in fowls. <Amer. Nat., April [15 March], 1883, v. 17, pp. 422–423.
  - Lungs, bronchia, and linings of thoracic and abdominal cavities of a sick chicken covered with *Cytoleichus sarcoptoides* Mégnin; habitat of the same in fowls in Europe; diseases caused by it.
- 2158. [RILEY, C. V.] Prevalence of the screw-worm in Central America. <Amer. Nat., April [15 March], 18 3, v. 17, p. 423.
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- 2159. R[ILEY], C. V. Dried leaves as food for lepidopterous larvæ. <Amer. Nat., April [15 March], 1883, v. 17, pp. 423-424.
  - Review of paper of A.H. Mundt; larvæ successfully fed upon fresh leaves transported from a distance under pressure; chopping the leaves would possibly permit of more rapid curing and more convenient packing.
- 2160. [RILEY, C. V.] Lepidopterological notes. <Amer. Nat., April [15 March], 1883, v. 17, p. 424.
  - Duplication of descriptions of the early stages of Lepidoptera to be avoided; notice of Mrs. C. H. Fernald's list of *Noctuide* taken in Orono, Me.

- 2161. [RILEY, C. V.] Obituary. <Amer. Nat., April [15 March], 1883, v. 17, p. 424.
  - Obituary notices of G. W. Belfrage and F. W. Mæklin.
- 2162. R[ILEY], C. V. Mosquitoes vs. malaria. <Sci. Amer., 14 April, 1883, v. 48, pp. 224–225. S.-b. No. 42, pp. 63–64; No. 67, p. 8. Abstract: <Amer. Nat., May [18 April], 1883, v. 17, p. 549.
  - Criticism of the views of Dr. A. F. A. King in support of the thesis that malarial disease is the result of inoculation of the body with malarial poison by the bites of insects; citation of twenty correspondencies in the conditions affecting the prevalence of mosquitoes [Culicidæ] and malarial disease.
- 2163. RILEY, C. V. Jumping seeds and galls. <Sci. Amer., 14 April, 1883, v. 48, p. 228, fig. S.-b. No. 42, pp. 61-63; No. 67, p. 2.
  - Figures of larva, pnpa, and imago of Carpocapsa saltitans, with figures and description of seeds inhabited by the larva of this moth, and description of the plant bearing these seeds; vernacular names of plant and insect; movements imparted to the seeds by the insects and by Cynips q.-saltatorius to the galls of the same.

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- 2167. RILEY, C. V. Number of molts and length of larval life as influenced by food. <Amer. Nat., May [18 April], 1883, v. 17, pp. 547-548.
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- 2168. [Riley, C. V.] Entomological notes. <Amer. Nat., May [18 April], 1883, v. 17, pp. 549-550.

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- 2169. RILEY, C. V. Larval stages and habits of the bee-fly *Hirmoneura*. <Science, 27 April, 1883, v. 1, pp. 332–334, figs. 1–3. S.-b. No. 42, p. 52.
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- 2170. RILEY, C. V. The capitalizing of specific names. <Papilio, March [April], 1883, v. 3, p. 62.
  - Inquiry as to the use and purpose of capitalizing specific names.. See No. 2257.
- 2171. RILEY, C. V. Observations on the fertilization of Yucca and on structural and anatomical peculiarities in Pronuba and Prodoxus. <Gardener's Mo. and Hortic. April, 1883, v. 25, pp. 118–119. S.-b. No. 51, p. 122½. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1882, 1883, v. 31, pp. 467–468. Separate: <Salem. Mass., July, 1883, pp. 467–468. Abstract: <Amer. Nat., February [31 January], 1883, v. 17, p. 197.
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- 2172. RILEY, C. V. The potato-stalk borer. <Rural New Yorker, 12 May 1883. S.-b. No. 42a, p. 213.
  - Answer to inquiry; life-history and means against Baridius [= Trichobaris] trinotata.
- 2173. ŘILEY, C. V. Jumping seeds and galls. <Proc. U. S. Nat. Mus., 12 May, 1883, v. 5, pp. 632-635, fig. Separate: <[Washington, 1884], pp. 632-635, fig.
  - Description of seeds of "arrow-weed"; their motions caused by larvæ of Carpocapsa saltitans; figures of the seeds and of the larva, pupa, and imago of the Carpocapsa; habits and seasons of the same; description of the plant bearing these seeds; character and motions of the gall of Cynips q.-saltatorius.
- - Habits of *Pollenia rudis*; notice of recorded cases of swarming among the Diptera. See No. 2128.

- 2175. [RILEY, C. V.] The new classification of the Coleoptera of North America. <Amer. Nat., June [17 May], 1883, v. 17, pp. 660-661.
  - Notice of work of J. L. Leconte and G. H. Horn.
- 2176. RILEY, C.V. A pretty and unique gall-making tortricid. <Amer. Nat., June [17 May], 1883, v. 17, p. 661, fig. 1.
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- 2177. [RILEY, C. V.] Simulium feeding on other insects. <Amer. Nat., June [17 May], 1883, v. 17, pp. 661-662. Comment on note of H. A. Hagen.
- 2178. [RILEY, C. V.] Synopsis of the N. A. Heliothinæ. <Amer. Nat., June [17 May], 1883, v. 17, pp. 662-663. Review of paper of J. B. Smith; nature of the generic characters of Noctuidæ.
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- 2180. [RILEY, C. V.] Protection of insect collections. <Amer. Nat., June [17 May], 1883, v. 17, pp. 663-664.

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- 2181. [RILEY, C. V.] Cocoon of Telea polyphemus. <Amer. Nat.,
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  - Answer to inquiry of H. Morris; cocoon of *Telea polyphemus* usually falls to the ground with the leaves, yet quite frequently it is attached to twigs and does not fall to the ground.
- 2182. [RILEY, C. V.] The sucking organs of bees, wasps, and flies. <a href="mailto:Amer.Nat."><a href="mailto:Amer.Nat.">Amer. Nat.</a>, June [17 May], 1883, v. 17, pp. 664-665.

  Notice of paper of K. Kraepelin.
- 2183. [RILEY, C. V.] The "pine moth of Nantucket." <Amer. Nat., June [17 May], 1883, v. 17, pp. 665-666.
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- 2184. [RILEY, C. V.] Entomological notes. <Amer. Nat., June [17 May], 1883, v. 17, pp. 666-667.

  Brief notes on recent publications.
- 2185. RILEY, C. V. Elephantiasis or Filaria disease. <Science, 18 May, 1883, v. 1, pp. 419-421, fig. S.-b. No. 42, p. 51, fig. Criticism of the views of Dr. A. F. A. King: notice of the writings of P. Man-
  - Criticism of the views of Dr. A. F. A. King; notice of the writings of P. Manson and others on the connection of *Culex musquito* with the life-history of *Filaria sanguinis-hominis* and on the production of elephantiasis and related diseases by *Filaria*.
- 2186. RILEY, C. V. Nemestrinida. <Science, 8 June, 1883, v. 1, p. 513. Note on papers concerning Nemestrinida; supplementary to No. 2169.
- 2187. RILEY, C. V. The corn-root Diabrotica. <Rural New-Yorker, 9
  June, 1883. S.-b. No. 54, p. 42.
  Increasing distribution of Diabrotica longicornis; means against it.

- 2188. RILEY, C. V. Elm-leaf beetle. <Sci. Amer., 16 June, 1883, v. 48. S.-b. No. 42a, p. 265.
  - Reply to inquiries concerning Galeruca xanthomelana.
- 2189. RILEY, C. V. A unique and beautiful noctuid. <Amer. Nat., July [20 June], 1883, v. 17, pp. 788-790, fig.
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- 2190. [RILEY, C. V.] Insects affecting stored rice. <Amer. Nat., July [20 June], 1883, v. 17, p. 790.
  - Lists of insects, chiefly Coleoptera, found in a lot of damaged rice from the Chinese centennial exhibit; two species are carnivorous.
- 2191. RILEY, C. V. Hypermetamorphoses of the *Meloidæ*. <Amer. Nat., July [20 June], 1883, v. 17, pp. 790–791.
  - Proposal of simpler and more natural terms to designate the stages of development of larvæ of Meloidæ.
- 2192. [RILEY, C. V.] Entomological notes. <a href="mailto:Amer. Nat.">Amer. Nat.</a>, July [20 June], 1883, v. 17, pp. 792–793.

  Comments on recent entomological publications; items of news.
- 2193. RILEY, C. V. The grape Phylloxera in France. <Science, 22 June, 1883, v. 1, pp. 576-578.
- Review and criticism of the report of the Commission supérieure du Phylloxera.
- 2194. RILEY, C. V. Fig insects. <Science, 29 June, 1883, v. 1, p. 599. Review of S. S. Saunders's views on fig insects.
- 2195. RILEY, C. V. Egg-punctures on raspberry- and grape-vines, etc. <Rural New-Yorker, 30 June, 1883, v. 42, p. —. S.-b. No. 42, p. 56.
  - Answer to inquiry of T. H. G.; oviposition of *Œcanthus niveus* in stems of raspberry- and grape-vines, and of *Ceresa bubalus* in twigs of apple-trees; habits and ravages of and means against the former; the latter seldom very injurious.
- 2196. RILEY, C. V. Silk culture in the United States. <Rural New-Yorker, 14 July, 1883, v. 42, p. —. S.-b. No. 42a, p. 531.
  - Revival of interest in silk culture in the United States; experience of the year; relation of silk culture to import duties; warning against too high expectations as to profits; notes on manuals of silk culture.
- 2197. RILEY, C. V. Economic entomology of Iowa. Sci. Amer., 14

  July, 1883, v. 49, p. —. S.-b. No. 53, p. 147.
  - Review of work done in Iowa, especially of papers of J. N. Dixon, H. Osborn, and A. B. Walton.
- 2198. [RILEY, C. V.] Insect plagues. <Boston Herald, 22 July, 1883, p. —. S.-b. No. 42, pp. 53-54; No. 67, p. 11. Extract: <Mirror and Farmer, 26 July, 1883, v. 35. S.-b. No. 42, pp. 126-127.
  - Newspaper interview; seasons, habits, ravages of and means against Caloptenus atlanis, Nematus erichsonii, and Orgyia leucostigma.
- 2199. RILEY, C. V. Report by C. V. Riley. <Proc. U. S. Nat. Mus., 27. July, 1883, v. 6, pp. 104-105. Reprint: <Sci. Amer. Suppl., 13 October, 1883, v. 16, p. 6486.
  - Note to F. Humbert's Lucilia macellaria infesting man; references to other mentions of it; its distribution and means against it.
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- 2200. RILEY, C. V. Emulsions of petroleum and their value as insecticides. <Proc. Amer. Assoc. Adv. Sci. for 1882, 1883, v. 31, pp. 469-470. Separate: <Salem, Mass., July, 1883, pp. 469-470. Reprint: <Kansas City Rev. of Science and Industry, November, 1883, v. 7, pp. 447-448. S.-b. No. 42, p. 124. Extract: <Sci. Amer., 19 November, 1883, v. 49, p. 294. S.-b. No. 51, p. 153.
  - Description of modes of making emulsions of petroleum for use against insects.
- 2201. [RILEY, C. V.] The old, old question of species. <Amer. Nat., September [15 August], 1883, v. 17, p. 975.
  - Comments upon the discussion between H. A. Hagen and W. H. Edwards; views of both parties extreme; views as to the true nature of species.
- 2202. [RILEY, C. V.] Myrmecophila. <Amer. Nat., September [15 August], 1883, v. 17, pp. 975-976.

  Record of recent captures of Myrmecophila in Oregon and District of Colum-

bia; record of former captures in the United States; habits of the genus.

- 2203. [RILEY, C. V.] Salt-water insects used as food. <Amer. Nat., September [15 August], 1883, v. 17, pp. 976-977.
  - Occurrence of Ephydra (hians?) in Lake Tetscoco, Mexico; E. gracilis found in Great Salt Lake, Utah, and E. californica in lakes in California; account by W. H. Brewer of the manner in which the last-named species is collected and used for food by the Indians living near Mono Lake.
- 2204. [RILEY, C. V.] Food-plants of Samia cynthia. <Amer. Nat., September [15 August], 1883, v. 17, p. 977.
  - Review of paper of H. H. Birney; list of plants on which Samia [== Attacus] cynthia has hitherto been found feeding; some of these are the favorite food-plants of Callosamia [= Attacus] promethea.
- 2205. [RILEY, C. V.] Bitten by an aphid? <Amer. Nat., September [15 August], 1883, v. 17, p. 977.
  - Letter of S. Swan, with answer; Siphonophora [= Nectarophora] rudbeckiæ common on Solidago and Rudbeckiæ; the biting was probably caused by antsor some other insect that escaped notice at the time.
- 2206. RILEY, C. V. Steganoptycha claypoleana. <Amer. Nat., September [15 August], 1883, v. 17, p. 978. Reprint: <Papilio, September-December, 1883, v. 3, p. 191.
  - Comparative description of Steganoptycha claypoleana with Proteoteras asculanum; habits of the former.
- 2207. R[ILEY], C. V. Extermination and restriction of Phylloxera in Switzerland. <Rural New-Yorker, 25 August, 1883, v. 42. S.-b. No. 49, p. 74.

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- 2208. RILEY, C. V. Hackberry psyllid galls. <Ca. Ent., August [5 September], 1883, v. 15, pp. 157-159, figs. 6, 7.
  - Critical review of paper of T. W. Fyles; Phylloxera vastatrix has many parasites and Cellis is attacked by many species of gall-insects; characters of Pachypsylla n. g. [p. 157]; figures of galls of P. celtidis-venusta and P. c.-mamma; derivation and orthography of the generic term Celtis.

- 2209. RILEY, C.V. Some recent discoveries in reference to Phylloxera. <Science, 7 September, 1883, v. 2, p. 336. S.-b. No. 42, pp. 68, 69. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1883, 1884, v. 32, p. 320. Separate: <Salem, Mass., July, 1884, p. 320. <Amer. Nat., December [28 November], 1883, v. 17, p. 1288.
  - Summary of the cycle of development of the genus *Phylloxera*; character of the gall of *P. spinosa* and location of the impregnated egg of the species.
- 2210. RILEY, C. V. The *Psyllidæ* of the United States. <Science, 7 September, 1883, v. 2, p. 337. S.-b. No. 42, pp. 67-68. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1883, 1884, v. 32, p. 319. Separate: <Salem, Mass., July, 1884, p. 319.
  - Characteristics and economic importance of *Psyllida*; status of the present knowledge of this family in the United States; list of new genera and species; food plants of the same; characteristics of the eggs and young of *Psyllida*.
- 2211. RILEY, C. V. Improved method of spraying trees for protection against insects. <Science, 14 September, 1883, v. 2, p. 378. S.-b. No. 42, p. 68. Reprint: <Proc. Amer. Asoc. Adv. Sci. for 1883, 1884, v. 32, pp. 466-467. Separate: <Salem, Mass., July, 1884, pp. 466, 467.

Description of apparatus, especially of "cyclone nozzle" and adjustable hose; mention of insecticide substances.

Note.—Nos. 2209-2211 were issued as a separate, Salem, 1884.

- 2212. [RILEY, C. V.] Entomology at Minneapolis. <Amer. Nat., 1883, v. 17: October [17 September], pp. 1068–1070; November [19 October], pp. 1169–1174.
  - Minutes of the meetings of the entomologists at the session of the American Association for the Advancement of Science; reorganization of the entomological club; election of officers and change in the constitution; abstracts of papers read.
- 2213. RILEY, C. V. Notes on Pædisca scudderiana. <Amer. Nat., October [17 September], 1883, v. 17, pp. 1069–1070.
  - Habits and variation of Padisca scudderiana; difference between the gall of this insect and that of Gelechia gallasolidaginis.
- 2214. RILEY, C. V. A myrmecophilous lepidopteron. <Amer. Nat., October [17 September], 1883, v. 17, p. 1070.
  - Larva of Helia americalis found in nests of Formica rufa; this species the only one of the Lepidoptera known to develop in ants' nests.
- 2215. [RILEY, C. V.] Enemies of the egg-plant. <Amer. Nat., October [17 September], 1883, v. 17, p. 1070.
  - Extract from a letter of A. Œmler, proving that the occurrence of Cassida texana and Doryphora juncta on Solanum melongena is not accidental or temporary.
- 2216. [RILEY, C. V.] The periodical Cicada in southeastern Massachusetts. < Amer. Nat., October [17 September], 1883, v. 17, p. 1071.
  - Note to paper of C. E. Bessey; Cicada [= Tibicen] septendecim at Martha's Vineyard, Mass., in June, 1883, the precursor to septendecim Brood XXI which will appear in North Carolina and Virginia as well as Martha's Vineyard in 1884; accelerated specimens of the same brood received from Loudoun County, Va., recently.

- 2217. RILEY, C. V. Habits of *Murmidius*. <Amer. Nat., October [17 September], 1883, v. 17, p. 1071.
  - List of insects found in a lot of damaged rice from South America; occurrence of *Murmidius ovalis* in vast numbers in this rice; its probable food-habits; description of its cocoon; list of families of beetles some of whose larvæ spin cocoons; habitat of *Myehocerus*.
- 2218. [RILEY, C. V.] Obituary. <Amer. Nat., October [17 September], 1883, v. 17, p. 1072.
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- 2219. [RILEY, C. V.] Entomological notes. <Amer. Nat., October [17 September], 1883, v. 17, pp. 1072–1073.
  - Notes on recent entomological publications; items of news.
- 2220. [RILEY, C.V.] Economic notes. < Amer. Nat., October [17 September], 1883, v. 17, pp. 1073-1074.
- Comments on the ravages of several injurious insects during the past season.

  2221. RILEY, C. V. A parasite of the cabbage-worm. <Rural New-
- Yorker, 6 October, 1883, v. 42. S.-b. No. 42, p. 58.

  Answer to letter of J. H. B.; parasitism of *Pteromalus puparum* in larvæ and pupæ of *Pieris rapæ*.
- 2222. RILEY, C. V. The handmaid moth. <Rural New Yorker, 13 October, 1883, v. 42. S.-b. No. 42, p. 77.
  - Answer to inquiry of H. B. S.; description of larva, pupa, and image of Datana ministra from hickory- and walnut-trees, and of a phytophagic variety of the larva from apple and other trees; habits of the larvæ; the larvæ unusually abundant in 1883.
- 2223. RILEY, C. V. Remarks on Arzama obliquata. <Amer. Nat., November [19 October], 1883, v. 17, p. 1169.

  Description of the aggregate of Arzama obliquata: colors and habitat of the
  - Description of the egg-mass of Arzama obliquata; colors and habitat of the larva; variations of the imago; number of annual broods.
- 2224. [RILEY, C. V.] Rare monstrosities. <Amer. Nat., November [19 October], 1883, v. 17, p. 1175.
  - Notice of monstrosities recorded in Melanippe montanata and Zygæna minos.
- 2225. [RILEY, C. V.] The nervous system of insects. <Amer. Nat., November [19 October], 1883, v. 17, pp. 1175-1176. Summary of the observations of Ed. Brandt.
- 2226. [RILEY, C. V.] Hymenorus rufipes as a myrmecophilous species. <Amer. Nat., November [19 October], 1883, v. 17, p. 1176.

  Imagos of Hymenorus rufipes raised from larvæ found in nests of Formica fusca;
  - character of the nests of the Formica; food-habits of the Hymenorus unknown.
- 2227. [RILEY, C. V.] Recent publications. <Amer. Nat., November [19 October], 1883, v. 17, p. 1177.

  Notice of J. H. Comstock's work on Diaspina and of other recent publications.
- 2228. [RILEY, C. V.] Entomological notes. <Amer. Nat., November [19 October], 1883, v. 17, pp. 1177-1179.
  - Review of "General Index of the Entomological Reports of the Province of Ontario;" recent publications and items of news.

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- 2229. RILEY, C. V. The potato-stalk borer. <Rural New-Yorker, 20 October, 1883. S. b. No. 42, pp. 78-79.
  - Answer to letter of S. C. R.; description, habits of, and means against Gortyna nitela; means against Paria aterrima, Graphops pubescens, and other larvæ of Chrysomelidæ injurious to the roots of strawberry-plants.
- 2230. [RILEY, C. V.] Recent advances in horticultural entomology. <Rural New-Yorker, 20 October, 1883, v. 42. S.-b. No. 42, pp. 79-81. Reprint: <Proc. 19th Sess. Amer. Pomol. Soc., 1884, p. 45. <Trans. Wise. State Hortic. Soc., 1886, v. 17, p. —.
  - Report of address delivered; discussion of measures recommended for adoption to prevent the ravages of insects injurious to horticulture, especially of Carpocapsa pomonella and Conotrachelus nenuphar; correction of statements in regard to the oviposition of Saperda bivittata [= candida] and ? Bembex marginata; advance in knowledge of the life-history of Aphididæ and in the development of machinery for the application of poison sprays to plants; relative value of the principal insecticides.
- 2231. RILEY, C. V. On a gall-making genus of *Apioninæ*. <Bull. Brooklyn Ent. Soc., October, 1883, v. 6, pp. 61-62. Separate: <Brooklyn, N. Y., 1883, 2 pp.
  - List of North American gall-making Coleoptera; description of *Podapion* n. g. [p. 62] and of the gall and image of *P. gallicola* n. sp., found on twigs of *Pinus inops*; probable life-habits, inquilines, and parasite of this species.
- 2232. RILEY, C. V. Report of the Entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1883, pp. 99–180, 13 pl. Separate: <Washington, 31 October, 1883, pp. 5+pp. 99–180+pp. 7, 13 pl.

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| 2234. | RILEY, C. V. Osage orange vs. mulberry for the silk-we  | orm.    |
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42, p. 118.

Comparative value of leaves of Maclura aurantiaca and of Morus as food for Scricaria mori; critical review of V. des Lauriers's conclusions.

p. 91. Reprint: <Amer. Nat., 5 January, 1884, v. 18, pp. 78-79. <Prairie Farmer, 22 March, 1884, v. 56, p. 187. S.-b. No.

2235. RILEY, C. V. Entomological notes of the year. < Prairie Farmer, 24 November, 1883, v. 55. S.-b. No. 42, pp. 86-87.

Progress of experiments for the destruction of scale insects, Coccidæ; introduction of Aspidiotus rapax into California on apples from New Zealand; strawberries injured by Capsus oblineatus [= Lygus pratensis] and a myriapod in Illinois; occurrence of Leucania unipuncta in several places, and of Cecidomyia destructor in Illinois; extension of culture of Pyrethrum cinerariæfolium in California; occurrence of Anarsia lineatella on strawberry-plants in Illinois; of Doryphora juncta and Cassida texana on Solanum melongena in Georgia; of Ceresa bubalus on potato-plants in Pennsylvania; of Epilachna corrupta on wax-beans, etc.

2236. RILEY, C. V. A satisfactory remedy for melon bugs, flea-beetles, etc. <Rural New-Yorker, 3 November, 1883, v. 42. S.-b. No. 42, pp. 77-78.

Quinn's method of sprinkling the vines with a mixture of tobacco water and soft soap and then powdering with lime is probably the best general preventive against *Diabrotica rittata* and *Halticida*; description of J. M. Nicholson's siphon arrangement by which to keep the vines constantly moist with the liquid.

2237. RILEY, C. V. The chinch-bug in New York. <Science, 9 November, 1883, v. 2, p. 621. Extract: <Sci. Amer., 22 December, 1883, v. 49, p. 384. S.-b. No. 42, pp. 122–123.

Present outbreak of Blissus leucopterus in New York the result of an increase due to favorable conditions rather than an invasion.

2238. R[ILEY], C. V. Insects in relation to agriculture. <Stoddart's Encylopædia Americana, 1883, v. 1, pp. 135-142, figs. 1-29.

Chapter 9 of article "Agriculture." Brief accounts with numerous illustrations of the insects named below, and of means against them, with cross-references to accounts of other insects in other portions of the work. The headings and subjects of the sub-chapters are as follows:

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- 2239. R[ILEY], C. V. Army-worm, Leucania unipuncta, Haw. <Stoddart's Encylopædia Americana, 1883, v. 1, pp. 317-318, 2 figs. Distribution, seasons, habits, and food-plants of and means against Leucania unipuncta; references to the more important articles on this insect; figures of larva and imago.
- 2240. RILEY, C. V. An epidemic disease of *Caloptenus differentialis*. <Amer. Nat., December [28 November], 1883, v. 17, p. 1287.

  Note to communication of H. Osborn; the *Entomophthora calopteni* a result rather than the cause of disease.
- 2241. RILEY, C. V. The growth of insect eggs. < Amer. Nat., December [28 November], 1883, v. 17, p. 1289.

Notice of paper of J. A. Osborne; swelling of the eggs of Phaneroptera [= Scudderia] curvicauda probably connected with embryological development.

- 2242. [RILEY, C. V.] Protective device employed by a glaucopid caterpillar. <Amer. Nat., December [28 November], 1883, v. 17, p. 1289.
  - Notice of paper of F. Müller; general use of shed hairs by larvæ of Arctiidæ in the construction of their cocoons; description of method in which the larva of Eunomia eagrus arranges its shed hairs to form a protection for the pupa.
- 2243. [RILEY, C. V.] Saw-fly larvæ on the quince. <Amer. Nat., December [28 November], 1883, v. 17, p. 1289.

Notice of paper of J. A. Lintner; food-plants of Selandria [=Eriocampa] cerasi.

- 2244. [RILEY, C. V.] Entomology in New York. < Amer. Nat., December [28 November], 1883, v. 17, pp. 1289-1291.
  - Review of J. A. Lintner's first annual report as State entomologist; list of subjects treated in the report.
- 2245. [RILEY, C. V.] Fruit insects in California. < Amer. Nat., December [28 November], 1883, v. 17, p. 1291.
  Review of M. Cooke's "Injurious Insects of the Orchard."
- 2246. [RILEY, C.V.] Death of Dr. J. L. Leconte. < Amer. Nat., December [28 November], 1883, v. 17, p. 1291.

  Notes the loss to entomologists occasioned by the death of J. L. Leconte.
- 2247. [RILEY, C. V.] Entomological notes. <Amer. Nat., December [28 November,] 1883, v. 17, pp. 1291–1292.

  Brief notices of published articles with items of news.
- 2248. [RILEY, C. V.] Economic notes. <Amer. Nat., December [28 November], 1883, v. 17, p. 1292.

  Effect of Phylloxera laws in Europe; use of lime as a means against Macrodactylus; award of the Le Brun prize for the most valuable improvement
- 2249. RILEY, C. V. [Raspberry canes punctured by Orchelimum glaberrimum.] <Fruit Recorder, Purdy, 1 December, 1883, v. 15. S.-b. No. 42, p. 92.
  - Description of and means against Orchelimum glaberrimum.

relating to the silk industry.

- 2250. [RILEY, C. V.] The Phylloxera in sandy soil. <Rural New-Yorker, 1 December, 1883, v. 42. S.-b. No. 42, p. 97. Reprint: <Amer. Nat., January, 1884 [29 December, 1883], v. 18, p. 78.
  - Condition of the grape crop in France; favorable account of the use of American grape-stocks; *Phylloxera vastatrix* harmless in sandy soils.
- 2251. RILEY, C. V. Bacterial disease of the imported cabbage-worm. <Sci. Amer., 1 December, 1883, v. 49, p. 337. S.·b. No. 42, pp. 91–92. Reprint: <Amer. Nat., January, 1884 [29 December, 1883], v. 18, p. 80.
  - Notice of observations of S. A. Forbes on the death of larvæ of *Pieris rapæ* from infection by *Bacterium*; previous mention of this disease.
- 2252. RILEY, C. V. The chinch-bug in New York State. <Sci. Amer., 8 December, 1883, v. 49. p. 359. Reprint: <Amer. Nat., 5 January, 1884, v. 18, pp. 79-80.
  - Critical review of papers of J. A. Lintner; the occurrence of *Blissus leucopterus* in New York in unusual abundance in 1882 and 1883 is not warrant for great alarm. See No. 2271.
- 2253. RILEY, C. V. Reports of observations and experiments in the practical work of the division, made under the direction of the entomologist. <Bull. No. 3, Div. Ent. U. S. Dept. Agric., [8 December], 1883, 75 pp., 3 pl.

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- 2254. RILEY, C. V. Entomology in New York. <Rural New-Yorker, 15 December, 1883. S.-b. No. 42, pp. 85-86.
  - Review of J. A. Lintner's first report (for the year 1881) as State entomologist of New York.
- 2255. RILEY, C. V. Lucilia macellaria. <Sci. Amer., 15 December, 1883, v. 49, p. 373. S.-b. No. 42, p. 93.
  Critical review of paper of F. Humbert.
- 2256. RILEY, C. V. Dipterous larvæ in the human body. <Sci. Amer., 22 December, 1883, v. 49, p. 385. S.-b. No. 42, p. 90.
  - References to and notices of several articles on the occurrence of larvæ of Diptera in the human body; synonymy and distribution of Compsomyia [=Lucilia] macellaria; myasis caused solely by larvæ of Sarcophagidæ and Museidæ; Estridæ occur rarely and exceptionally in the human body.
- 2257. RILEY, C. V. Capitalizing specific names. <Papilio, September-December, 1883, v. 3, pp. 164-166. Separate: <[N.Y.], 3 pp. Comments on reasons given by W. H. Edwards and others for the uniform capitalizing of specific names. See No. 2172.
- 2258. R[ILEY], C. V. Townend Glover. <Papilio, September-December, 1883, v. 3, pp. 167-168.

  Obitnary notice.
- 2259. [RILEY, C. V.] The genus *Colias*. < Amer. Nat., [5] January, 1884, v. 18, pp. 74-76.
  - Review of paper of H. A. Hagen; discussion of the species of *Colias* in North America; plastic nature and classificatory characters of the genus.
- 2260. [RILEY, C. V.] Larval habits of the dipterous family *Dexidæ*. <Amer. Nat., [5] January, 1884, v. 18, pp. 76-77.
  - Notice of paper of F. Brauer; parasitism of Dexia rustica and of Phorostoma latum on the larva of Rhizotrogus and of Melanophora? diabrotica on Diabrotica vittata.
- 2261. [RILEY, C. V.] Entomological notes. <Amer. Nat., [5] January, 1884, v. 18, pp. 80-81.
  - Carpocapsa pomouella has been introduced into Australia, New Zealand, and Tasmania; occurrence of Myrmicocela ochraceella in ants' nests.
- 2262. RILEY, C. V. Recent outbreaks of the army-worm. < Rural New-Yorker, 12 January, 1884, v. 43, p. 19. S.-b. No. 56, p. 145.

  Rare occurrence of Leucania unipuncta in 1882 and 1883, following its last abun-
- dance in 1881; occurrence of its larvæ at East Windsor, Vt., in June, 1883. 2263. [RILEY, C. V.] The harlequin cabbage-bug, etc. <Rural New-Yorker, 2 February, 1884, v. 43, p. 70. S.-b., No. 63, p. 41.
  - Habits of and means against Murgantia histrionica; effect of chemicals applied to the soil npon the colors of flowers.

- 2264. RILEY, C. V. Tribute to the memory of John Lawrence Leconte. <Psyche, November-December, 1883 [11 February, 1884], v. 4, pp. 107-110. Separate: <[Cambridge, Mass., 11 February, 1884], pp. 107-110. Notice: <Psyche, loc. cit., p. 119.
  - Biographical notice of J. L. Leconte; his work and writings; his personal character; disposition of his entomological collection.
- 2265. [RILEY, C. V.] Fruit culture in the South. < Washington Post, 26 February, 1884. S.-b. No. 42, pp. 119-120.

Interview with a reporter; means against insects infecting the orange.

- 2266. RILEY, C. V. Oviposition of the round-headed apple-tree borer. <Rural New-Yorker, 1 March, 1884, v. 43, p. 132, fig. 73. S.-b. No. 42, p. 85; No. 67, p. 3.
  - Notice of paper of C. G. Atkins; confirmation of the account of the method of oviposition of Saperda candida; description of this method; correction of several statements by W. Saunders in regard to the oviposition of different insects; description and figure of the egg of S. candida; figures of the burrows and hole of exit of this beetle; figures of the pupa and of the position of the egg when deposited.
- 2267. [RILEY, C. V., et al.] Third report of the United States Entomological Commission, relating to the Rocky Mountain locust, the Western cricket, the army-worm, canker-worms, and the Hessian fly; together with descriptions of larvæ of injurious forest insects, studies on the embryological development of the locust and of other insects, and on the systematic position of the Orthoptera in relation to other orders of insects; with maps and illustrations. <Washington: 1883 [6 March, 1884], pp. 14+347+12+92, 18 figs., 64 pls., 4 maps.

LETTER OF SUBMITTAL
PREFACE.
XIII

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- 2268. [RILEY, C. V.] The silk industry in the United States. <Sci. ence, 7 March, 1884, v. 3, pp. 290-292. S.-b. No. 42, pp. 82-84-Review of article of W. C. Wyekoff; early history and present status of silk eulture in North America; criticism of the estimates of the amount of silk raised in early times; relations of silk-culture and silk-manufacture to free trade and protection in the United States.
- 2269. RILEY, C. V. The army-worm. < Washington, 1883 [20 March, 1884], pp. 89–152, pl. 1–2, with 1 p. expl. of pl. Advance reprint of principal portions: <Rept. [U. S.] Com. Agric. for 1881–1882, January, 1883, pp. 89–106.

Chapter 6 of the Third Report U. S. Entomological Commission. See No. 2267 for synopsis of contents.

2270. RILEY, C. V. Canker-worms. < Washington, 1883 [20 March, 1884], pp. 157–198, pl. 3, with 1 p. expl. of pl. Extract: < Amer.

- 2270. RILEY, C. V.—Continued.
  - Cult., 1884, v. 46: 29 March, p. 1; 5 April, p. 1. S.-b. No. 42, pp. 118–119; No. 57, pp. 86–87.
  - Chapter 7 of Third Report U. S. Entomological Commission. See No. 2267 for synopsis of contents.
- 2271. [RILEY, C. V.] The chinch-bug. Another entomologist expresses his views regarding the farmers' pest. <Watertown [N. Y.] Daily Times, 27 March, 1884, v. 24. S-b. No. 57, pp. 42–43. Reprint: <Ogdensburg Journal, 1884.
  - Notice of articles of J. A. Lintner; the occurrence of *Blissus leucopterus* in New York State in unusual abundance in 1882 and 1883 not a cause for great alarm; means against this insect. See No. 2252.
- 2272. RILEY, C. V. Notes on North American *Psyllidæ*. <Proc. Biol. Soc. Wash., 1884, v. 2, pp. 67–79. Separate: <[Washington], 10 April, 1884, pp. 67–79.
  - Notice of earlier studies of European and North American Psyllida; list of 18 nominal species described from North America; systematic and synonymical list of the same; descriptions of Pachypsylla n. g. [p. 71], P. venusta, P. celtidis-mamma, and P. [Blastophysa n. s-g., p. 75] celtidis-genma n. sp. [p. 74]; dichotomic table of the three species of Pachypsylla; descriptions of Ceropsylla n. g. [p. 76] sideroxyli n. sp. [p. 76], Rhinopsylla n. g. [p. 77] schwarzii n. sp. [p. 78].
- 2273. RILEY, C. V. Remarks on the bag-worm, *Thyridopteryx epheme-ræformis*. <Proc. Biol. Soc. Wash., 1882–1884, 1884, v. 2, pp. 80–83, figs. 1–3. Separate: <[Washington], 10 April, 1884, pp. 80–83, figs. 1–3.
  - Explanation of the more important and less known facts in relation to the life-history of *Thyridopteryx ephemeræformis*, especially in reference to the act of coition; figures of all stages and of the external male genitalia.
- 2274. RILEY, C. V. The use of naphthaline as an insecticide. <Science, 11 April, 1884, v. 3, pp. 455-456.
  - Review and summary of article of E. Fischer.
- 2275. RILEY, C. V. Entomography of Hirmoneura. <Science, 18 April, 1884, v. 3, p. 488.
  - Review of F. Brauer's observations on the life-history of Hirmoneura obscura.
- 2276. RILEY, C. V. Orthoptera. <Standard Natural History (The) ... Boston, Cassino, 1 May-27 July, 1884, v. 2, pp. 167-203, 1 pl., figs. 243-285. Reprint: <Riverside Natural History (The) ... Boston and New York, Houghton, Mifflin & Co., 1888, v. 2, pp. 167-203, 1 pl., figs. 243-285.
  - Systematic position, limitations, classificatory characters, transformations, molts, and geographical and geological distribution of the order; characters, habits, and distribution of the several families; mention of the principal North American and of some foreign species, with more particular accounts of many species, especially in regard to their stridulation and oviposition, with figures of a few species and of their eggs. Ectobia germanica, Phasmomantis carolina, Diapheromera femorata, Ecanthus niveus, E. latipennis, Orocharis saltator, Camptonotus scudderi, Cyrtophyllus concavus, Microcentrum retinerve, and Caloptenus spretus are particularly mentioned.
- 2277. RILEY, C. V. Reports of observations and experiments in the practical work of the division, made under the direction of the

entomologist, together with extracts from correspondence on miscellaneous insects. <Bull. No. 4, Div. Ent. U. S. Dept. Agric. [3 May], 1884, 102 pp., 4 figs.

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- 2278. RILEY, C. V. Silk-culture in the colonies. <Science, 9 May, 1884, v. 3, pp. 562-563.
  - Explanation of several technical terms used in silk-culture.
- 2279. RILEY, C. V. Maple-tree insects. <Sci. Amer., 24 May, 1884, v. 59, p. 325. S.-b. No. 63, p. 45.
  - Answer to inquiry of R. H. Cutler; food-plants of and means against Pulvinaria innumerabilis.
- 2280. RILEY, C. V. Aeronyeta betulæ n. sp. <Bull. Brooklyn Ent. Soc., May, 1884, v. 7, pp. 2-3, fig.
  - Description of Aeronycta betulæ n. sp. [p. 2], reared from Betula nigra; seasons and habits of larva; comparison with related species.
- 2281. RILEY, C. V. Recent advances in economic entomology. <Proc. Philos. Soc. Washington, 1884, v. 7, pp. 10-12. Separate: <Washington, 1884, pp. 10-12. Reprint: <Kansas City Review of Science, May, 1884, pp. 13-15. S.-b. No. 63, pp. 43-44. Characteristics of according entomology as a science and difficulties of its
  - Characteristics of economic entomology as a science and difficulties of its prosecution; the chief insecticide substances and their applicability; recent progress in mechanical appliances.
- 2282. RILEY, C. V. Department of insects. <Ann. Rept. of Regents Smith. Inst. for 1882, 1884, pp. 215-216.
  - List of accessions to the U.S. National Museum, with comments; note on the Glover plates and manuscripts.
- 2283. RILEY, C. V. Quelques mots sur les insecticides aux États-Unis et proposition d'un nouveau remède contre le Phylloxera. Communication faite à la Société d'Agriculture de l'Hérault à la seance du 30 Juin, 1884. <Montpelier, 1884, t-p. cover+8 pp. Reprint: <Messager Agricole, 10 July, 1884, ser. 3, v. 5, pp. 255-265. <La Vigne Amer., July, 1884, v. 8, No. 7, p. 207.
  - Resistant vines better than the best insecticides as a means against *Phylloxera* vastatrix; principal insecticides in use, especially arsenical substances, petroleum and pyrethrum; method of action and mode of application of these insecticides, especially application by the cyclone nozzle, and the subterranean application of kerosene emulsion as a means against *Phylloxera vastatrix*; tobacco vapor, under favorable conditions, would probably kill this insect.

| 040   | , DIDITOUNIE OF LOOKOMIC LIVEOUGUS  |
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| 2284. | [RILEY, C. V.] Remedies for various insects. < Prairie Farmer,  |
|       | 26 July, 1884, v. 56, p. 470. Sb. No. 59, p. 36.  |
|       | Comparative efficacy and other qualities of several insecticides, especially  |
|       | arsenical substances, tobacco vapor, petroleum emulsions, and pyrethrum.  |
| 2285. | RILEY, C. V. Habits of Grapholitha olivaceana. < Ent. Mo. Mag.,   |
|       | August, 1884, v. 21, p. 67.   |
|       | Grapholitha olivaceana bred from curled tips of Solidago.   |
| 2286. | RILEY, C. V. Rhyssa not lignivorous. <science, 1884,="" 28="" 4,="" 486.<="" november,="" p.="" th="" v.=""></science,>   |
|       | Parasitic habits of Rhyssa [= Thalessa] upon Tremex columba.  |
| 9987  |   |
| 2201. | RILEY, C. V. The apple-root borer. <rural 13="" de-<="" new-yorker,="" th=""></rural>                                     |
|       | cember, 1884, v. 43, p. 831. Sb. No. 63, p. 50.   |
| 2000  | Means against the larva of Prionus laticollis.  |
| 2288. | RILEY, C. V. A new insect injurious to wheat. <bull. brook-<="" th=""></bull.>  |
|       | lyn Ent. Soc., December, 1884, v. 7, pp. 111-112. Separate:   |
|       | <[Brooklyn, N. Y., December, 1884], p. 111.   |
|       | Description of larva, pupa, and female image of <i>Isosoma grande</i> n. sp. [p. 111] rearcd from wheat stems in Indiana. |
| 2289. | RILEY, C. V. The insects of the year. <science, 26="" december,<="" th=""></science,>                                     |
|       | 1884, v. 4, pp. 565–568.  |
|       | Entomological calendar for each month of the year.  |
| 2290. | RILEY, C. V. On the care of entomological specimens. <sci-< th=""></sci-<>  |
|       | ence, 9 January, 1885, v. 5, p. 25.   |
|       | Reply to editorial comments on the care of entomological specimens in the National Museum.                                |
| 2291  | RILEY, C. V. Report of the entomologist. <ann. [u.s.]<="" rept.="" th=""></ann.>  |
| 2201. | Commissioner Agric. for 1884, 1885, pp. 285–418, 10 pl. Sepa-   |
|       | rate: <washington: 1885,="" 285-418+<="" 31="" 9+pp.="" january,="" pp.="" td=""></washington:>                           |
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| 2292. | RILEY, C. V. General truths in applied entomology. Ess  | say.        |
|       | Trans. Ga. State Agric. Soc., 1884, v. —, pp. 153–159. See  | _           |
|       | ZIWIN OU 2001 1001, 1. —, pp. 100-100. Dt   | D.          |

- 2292. RILEY, C. V.—Continued.

  Rept., June, 1884, p. 33. <Sci. Amer. Suppl., 7 February, 1885, v. 19, p. 7588. S.-b. No. 61, p. 12.

  See No. 2291 for synopsis of contents.
- 2293. R[ILEY], C. V. Codlin moth. <Suppl. Encyclopædia Britannica, 9th ed., 1884, v. 2, p. 281, fig.
  Natural history, remedies, and figures of Carpocapsa pomonella.
- 2294. R[ILEY], C. V. Colorado potato-beetle. <Suppl. Encyclòpædia Britannica, 9th ed., 1884, v. 2. p. 311, fig.
  Summary of the eastward spread of Doryphora 10-lineata; natural history,

enemies, remedies, and figures of the same.

- 2295. R[ILEY], C. V. Cotton-worm. <Suppl. Encyclopædia Britannica, 9th ed., 1884, v. 2, pp. 432–433, figs.

  History, ravages, life-history, remedies, and figures of Aletia xylina.
- 2296. R[ILEY], C. V. Curculio, plum. <Suppl. Encyclopædia Britannica, 9th ed., 1884, v. 2, p. 494.

  Natural history and means against Conotrachelus nenuphar.
- 2297. RILEY, C. V. Insect named. < Daily Gate City [Keokuk, Iowa], 18 February, 1885. S.-b. No. 63, p. 31. Brief notes of Olfersia americana.
- 2298. RILEY, C. V. A new remedy for the imported cabbage-worm. <Rural New-Yorker, 28 February, 1885, v. 44, p. 132. S.-b. No. 63, p. 50. See: <Colman's Rural World, 5 March, 1885, v. 38, p. 76. S.-b. No. 63, p. 8. <Prairie Farmer, 7 March, 1885, v. 57, p. 153. S.-b. No. 61, p. 26. <Amer. Farmer, 1 April, 1885, v. 4, p. 105. S.-b. No. 67, p. 60. <Sci. Amer., 23 May, 1885, v. 52, p. 322. S.-b. No. 61, p. 19. <Indiana Farmer, 30 May, 1885. S.-b. No. 61, p. 22.
  - Ice-cold water applied during the heat of the day causes the death of the larva of *Pieris rapæ*.
- 2299. RILEY, C. V. The collection of insects in the National Museum. <Science, 6 March, 1885, v. 5, pp. 188-189. S.-b. No. 61, pp. 7-8. Answer to criticisms of C. H. Fernald; the insects in the National Museum cared for by the entomologist of the Department of Agriculture.
- 2300. RILEY, C. V. Ants and aphides. <Rural New-Yorker, 14 March, 1885, v. 44, p. 171. S.-b. No. 61, p. 19.
  - Answer to inquiry of J. McFarland; habits of ants in relation to plant-lice; subterranean plant-lice attended by ants; ants in northern States beneficial rather than injurious; ground can be cleared of them by injection of bisulphide of carbon or a strong kerosene emulsion.
- 2301. RILEY, C. V. Parasites of the larva of Lachnosterna fusca. <Psyche, 1884 [16 March, 1885], v. 4, p. 224.

  Criticism of statements of O. Lugger; larval habits of Tiphia inornata and Rhipiphorus sp.
- 2302. RILEY, C. V. Jumping spiders. <Rural New-Yorker, 11 April, 1885, v. 44, p. 250. S.-b. No. 63, p. 33.

  Answer to inquiry of H. B. S.; habits of Attus sp.

- 2303. RILEY, C. V. Circular No. 9 [U. S. Department of Agriculture, Division of Entomology]. <[Washington:] 1 May, 1885, 1 p., fo., 1 fig. Reprint: <Pacific Rural Press, 16 May, 1885. S.-b. No. 63, p. 27. <Weekly Times-Democrat [New Orleans], 23 May, 1885. S.-b. No. 61, p. 23. <Rural Californian, June. 1885, v. 80, p. 122. <S.-b. No. 61, pp. 20–21. <Sci. Amer. Suppl., 6 June, 1885, v. 19, p. 7859. S.-b. No. 63, pp. 25–26. <Pacific Rural Press, 16 May, 1885, v. 29, p. 469. S.-b. No. 63, p. 27. See: <Farmer's Review, 21 May, 1885, v. 14, p. 362. S.-b. No. 63, p. 29. N. Y. Weekly Sun, 27 May, 1885. S.-b. No. 63, p. 29. N. Engl. Farmer, 16 May, 1885. S.-b. No. 63, p. 29.
  - Conditions under which the Government will buy silk-worm eggs; how to select moths to produce eggs.
- 2304. RILEY, C. V. The imported elm-leaf beetle. Its habits and natural history and means of counteracting its injuries. <Bull. No. 6, Div. Ent. U. S. Dept. Agric. [14 May], 1885, 20 pp., 1 pl., 1 fig.
  - Treats of Galeruca xanthomelana; its habits and natural history; description, figures, remedies, and methods of application of insecticides.
- 2305. RILEY, C. V. Destroying Cicadas: Scurfy apple bark-louse. <Rural New-Yorker, 23 May, 1885, v. 44, p. 353. S.-b. No. 61, p. 24.
  - Answer to inquiries of J. A. K.; means against Cicada [= Tibicen] septendecim and Chionaspis furfurus.
- 2306. RILEY, C. V. [Poisonous spider.] <Rural New-Yorker, 23 May, 1885, v. 44, p. 354. S.-b. No. 61, p. 23.
  - Reply to statements of Dr. W. H. G.; no spider known whose foot-tracks kill leaves or trees.
- 2307. [RILEY, C. V.] Expected advent of the locust. <Sci. Amer., 23 May, 1885, v. 52, p. 320. S.-b. No. 61, p. 9. <Farmer's Home Journ., 13 June, 1885. S.-b. No. 63, p. 18. <Orange Co. [N. Y.] Farmer, 28 May, 1885. S.-b. No. 63, p. 23. <See: <Sci. Amer., 20 June, 1885, v. 52, p. 389. S.-b. No. 63, p. 28. Simultaneous appearance of a 17-year (Cicada [= Tibicen] septendecim) and a 13-year (C. [= T.] tredecim) brood; localities of the two broods; life-history
- 2308. RILEY, C. V. Rust of orange. <Rural New-Yorker, 16 May, 1885, v. 44, p. 355, figs. 196, 197. S.-b. No. 61, pp. 18–19, figs. 196–197. Reprint: <Colman's Rural World, 18 June, 1885, v. 38, p. 195, 2 figs. S.-b. No. 61, pp. 31–32, 2 figs.

and habits.

- Description, habits, and means against *Phytoptus ǫleivorus*; figures the same and its eggs; figure of a rusty orange.
- 2309. [RILEY, C. V.] Red-ants. <Sci. Amer., 21 May, 1885, v. 52, p. 183. S.-b. No. 66, p. 35.
  - Recommends pyrethrum, kerosene, hot water, and naphthaline as means against red-ants in houses.

- 2310. [RILEY, C. V.] Ridding the ground of cut-worms. <Rural New-Yorker, 30 May, 1885, v. 44, p. 368. S.-b. No. 63, p. 22.

  Answer to inquiry of V. R. R.; means against the larvæ of Agrotidæ.
- 2311. [RILEY, C. V.] An entomological breakfast. <N. Y. Times, 2 June, 1885. S.-b. No. 63, p. 1. See: <Belvidere [Ill.] Standard, 23 June, 1885. S.-b. No. 63, p. 7. Cicadas and Aerididæ as food.
- 2312. RILEY, C. V. The periodical or seventeen-year Cicada. < Harper's Weekly, 6 June, 1885, v. 29, p. 363, 4 figs. S.-b. No. 61, pp. 24-26, 4 figs.
  - Records and map showing distribution of brood XXII (septendecim) and of brood VII (tredecim); habits, enemies, and figures, with details of structure of Cicada [= Tibicen] septendecim; figure of twig punctured by the same and of twig healed after the puncture.
- 2313. [RILEY, C. V.] The winged pests of the West. <St. Louis Globe-Democrat, 9 June, 1885. S.-b. No. 61, p. 11.
  - Prediction that the northern States of the Mississippi Valley will escape serious damage from locusts this year; reasons for this opinion; ravages of Camnula pellucida in California.
- 2314. RILEY, C. V. The periodical or seventeen-year Cicada. < Amer. Grange Bulletin, 11 June, 1885. S.-b. No. 63, pp. 16-17. Chronological record, natural history, and popular names of Cicada [= Tibicaen] septendecim.
- 2315. RILEY, C. V. The periodical Cicada. An account of Cicada septendecim and its tredecim race, with a chronelogy of all broods known. <Bull. No. 8, Div. Ent. U. S. Dept. Agric., [17 June], 1885, 46 pp., 8 figs. Second edition, 13 July, 1885.
- 2316. RILEY, C. V. Notes on joint worms. <Rural New-Yorker, 20 June, 1885, v. 44, p. 418, figs. 215-218. Habits, means against, and figure of *Isosoma hordei*; criticism of A. J. Cook's

views on Isosoma; figures I. tritici and I. grande.

- 2317. RILEY, C. V. Beetles in the corn-fields. < Daily Gate City [Keokuk, Iowa], 23 June, 1885. S.-b. No. 61, p. 17.

  Answer to letters of J. M. Evans and J. M. Schaffer; Agonoderus pallipcs injurious to seed corn; recommends soaking the seed corn in Paris green or London purple.
- 2318. RILEY, C. V. Notes on the periodical Cicada. <Science, 26 June, 1885, v. 5, pp. 518-521. Reprint: <Sci. Amer. Suppl., 27 June, 1885, v.19, pp. 7905-7906. S.-b. No. 61, pp. 47, 48; No. 63, p. 74. Record showing distribution of brood XXII (septendecim) and of brood VII (tredecim) in 1885; the specific value of the different forms; long period of underground development; its life-history; food of the larva, methods of
- 2319. RILEY, C. V. The Chester onion pest. <Orange County [N. Y.] Farmer, 2 July, 1885. S.-b. No. 61, pp. 1–2. See: <Rural New Yorker, 5 December, 1885, v. 44, p. 829. S.-b. No. 61, p. 151.

burrowing, and transformations; the Cicada versus civilization.

Extract from Rept. U. S. Ent. for 1884; remedies against cabbage cut-worms; the poisoned ball system and keroscne emulsion effective against the onion cut-worm; formula for a soap-kerosene emulsion.

- 2320. RILEY, C. V. Premature appearance of the periodical Cicada. <Science, 3 July, 1885, v. 6, pp. 3-4.
  - Criticism of L. F. Ward's record of the occurrence and song of Cicada [= Tibicen] septendecim. See No. 2326.
- 2321. RILEY, C. V. Periodical Cicada in Massachusetts. <Science, 3 July, 1885, v. 6, p. 4.
  - The occurrence of Cicada [= Tibicen] septendecim in southeastern Massachusetts needs confirmation.
- 2322. RILEY, C. V. Destructive insects of the year. <Rural New Yorker, 11 July, 1885, v. 44, p. 464. S.-b. No. 61, p. 8.
  - Injuries and means against Agrotis malefida, Anthonomus musculus and Eury-creon rantalis; localities and food-plants of the last.
- 2323. [RILEY, C. V.] [Grasshopper ravages in California.] <Rural New-Yorker, 11 July, 1885, v. 44, p. 470. S.-b. No. 61, p. 2. Ravages committed by Melanoplus [= Caloptenus] devastator and Caloptenus
- differentialis; recommends the use of coal oil pans against them.

  2324. RILEY, C. V. Pests of the strawberry. <Rural New-Yorker, 18
  - July, 1885, v. 44, p. 484. S.-b. No. 61, p. 17.

    Answer to inquiry of J. H. J.; means against Agrotis tricosa, Phoxopteris fragaria, Eccopsis permundana and Emphytus [=Harphiphorus] maculatus.
- 2325. RILEY, C. V. The imported elm-leaf beetle. <Harper's Weekly, 18 July, 1885, v. 29, p. 463, 1 fig. S.-b. No. 61, pp. 21-22, fig. Natural-history descriptions and figures of all stages of Galeruca xanthomelæna; means against the same.
- 2326. RILEY, C. V. Premature appearance of the periodical Cicada. <Sci. Amer. Suppl., 15 August, 1885, v. 20, p. 8021.
  - Criticism of L. F. Ward's record of the occurrence and song of *Cicada* [= Tibicen] septendecim; an introductory note states that this article was prepared for Science, but that it appeared in that journal in a mutilated and weakened form. See No. 2320.
- 2327. RILEY, C. V. The cyclone nozzle. <Rural New-Yorker, 22 August, 1885, v. 44, p. 567. S.-b. No. 61, p. 34. Facts relative to the invention of the cyclone nozzle.
- 2328. RILEY, C. V. A new remedy against destructive locusts. <Rural New-Yorker, 29 August, 1885, v. 44, p. 577. S.-b. No. 61, p. 33.
  - Recommends the use of poisoned bait; formula of the same.
- 2329. RILEY, C. V. The influence of climate on *Cicada septendecim*. <Entom. Amer., August, 1885, v. 1, p. 91.
  - Records the transfers of eggs of brood XXII (septendecim) of Tibicen septendecim to the extreme southern States where no septendecim brood is known to occur, and of brood VII (tredecim) to northern States where no tredecim brood is known to occur.
- 2330. RILEY, C. V. Department of insects. <Ann. Rept. of Regents Smith. Inst. for 1883, 1885, pp. 239-244.
  - Brief mention of work accomplished in the U.S. National Museum; list of accessions to the collection.

- 2331. RILEY, C. V. Insects of the year. < Prairie Farmer, 3 September, 1885, v. 57, p. 567. S.-b. No. 63, p. 37; 134. See: < Entom. Amer., December, 1885, v. 1, pp. 176–177.
  - Ravages of Agrotis messoria, Anthonomus musculus, Eurycreon rantalis, Cecidomyia destructor, and Acrididæ on the Pacific coast.
- 2332. RILEY, C. V. On the parasites of the Hessian fly. <Proc. U. S. Nat. Mus., 14–17 September, 1885, v. 8, pp. 413–422, pl. 23. Abstract: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, pp. 332–334. <Amer. Nat., November, 1885, v. 19, pp. 1104–1105.
  - Description, synonymy, habits, and figures of Merisus destructor (Say); M. subapterus n. sp. [p. 416, pl. 23, f. 2: p. 333]; Eupelmus allynii French; Tetrastichus productus n. sp. [p. 419, pl. 23, f. 5: p. 333]; and Platygaster herrickii Packard.
- 2333. RILEY, C. V. Enemies of the black-walnut and willow. <Rural New-Yorker, 19 September, 1885, v. 44, p. 632. S.-b. No. 61, p. 35.
  - Habits, description of eggs, larva, and adult of Datana ministra; description of eggs, larva, and adult of Cimbex americana; means against both species.
- 2334. RILEY, C. V. The song-notes of the periodical Cicada. <Science, 25 September, 1885, v. 6, pp. 264-265. Reprint, with additions: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, pp. 330-332. Translation: <Stett. Ent. Zeit., 1886, jahrg. 47, pp. 158-160. See: <Science, 11 September, 1885, v. 6, p. 225. <Kansas City Review, October, 1885, p. 171.
  - Description of the three prevalent notes of Cicada [= Tibicen] septendecim.
- 2335. RILEY, C. V. The probabilities of locust or "grasshopper" injury in the near future, and a new method of counteracting their injury. <Colman's Rural World, 29 October, 1885, v. 38, p. 348. S.-b. No. 63, pp. 32-33. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, pp. 519-520. <Proc. 6th Meeting Soc. Prom. of Agric. Sci., Manhattan, Kans., 1886, pp. 38-39. See: <Mich. Christian Herald, 3 September, 1885. S.-b. No. 63, p. 39. <Amer. Grange Bull., 5 November, 1885. S.-b. No. 63, p. 34. <Prairie Farmer, 10 October, 1885, v. 57, p. 669. S.-b. No. 61, pp. 34-35.
  - The advance of settlement and cultivation will prevent such widespread injuries of *Caloptenus spretus* as occurred between 1874 and 1877; use of poisoned baits.
- 2336. RILEY, C. V. The present status and future prospects of silk-culture in the United States. <Entom. Amer., October, 1885, v. 1, pp. 139-140. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, p. 516. See: <Science, 11 September, 1885, v. 6, p. 236.
  - Abstract; headings under which the subject is discussed; summary of conclusions.

- 2337. RILEY, C. V. The grain moth. <Rural New-Yorker, 7 November, 1885, v. 44, p. 744. S.-b. No. 63, p. 56.
  Habits, descriptions, ravages, and means against Asopia farinalis.
- 2338. [Riley, C. V.] Profits of silk-culture. <Rural New-Yorker, 26 December, 1885, v. 44, p. 885. S.-b. No. 63, pp. 50-51.
  - Answer to inquiry of J. M. S.; actual cost of producing silk in different parts of the United States.
- 2339. RILEY, C. V. Aletia xylina vs. A. argillacea. <Entom. Amer., December, 1885, v. 1, pp. 161-163.
  - Reasons for considering Aletia xylina the correct name for the cotton-worm; advance print from No. 2343.
- 2340. [RILEY, C. V.] [Euphanessa mendica, etc.] < Entom. Amer., December, 1885, v. 1, pp. 170–171, 173, 176.
  - Remarks on papers read at the A.A.A.S.; Euphanessa mendica considered a geometrid; some characters of the Lepidoptera; life-habits of Ægeridæ.
- 2341. RILEY, C. V. On the hitherto unknown mode of oviposition in the *Carabidæ*. Abstract: <Proc. Amer. Assoc. Adv. Sci. for 1884, 1885, v. 33, pp. 538-539.
  - History of Chalanius impunctifrons traced from egg to imago; eggs laid singly on leaves of trees inclosed in mud or clay.
- 2342. RILEY, C. V. [Report of the Edinburgh International Forestry Exhibition.] < Rept. U. S. Dept. Agric. for 1884, 1885, pp. 167–179.
  - Brief mention of some of the insect collections exhibited.
- 2343. RILEY, C. V. Fourth report of the United States Entomological, Commission, being a revised edition of Bulletin No. 3, and the final report on the cotton-worm, together with a chapter on the boll-worm, with maps and illustrations. <Washington: 1885, [3 February, 1886], pp. 38+399+147, 45 figs., 64 pl., 2 maps.

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| 2344. RILEY, C. V. Reports of experiments with various insect substances, chiefly upon insects affecting garden crops, under the direction of the entomologist. <bull. 11,="" 1886,="" 26],="" 34="" [february="" agric.,="" dept.="" ent.="" no.="" pp.<="" s.="" th="" u.=""><th>made</th></bull.>  | made  |
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- 2346. [RILEY, C. V.] [Habitat of Mezium americanum.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 14. Occurrence of Mezium americanum in old hay.
- 2347. [RILEY, C. V.] [Arctic insects.] < Proc. Ent. Soc. Wash., [30] March], 1886, v. 1, pp. 14-15. Remarks on collection of insects made at Point Barrow, Alaska; prevalence
  - in Arctic regions of species common to America and Europe; occurrence of Urocerus flavicoruis in Alaska.
- 2348. [RILEY, C. V.] [Habits of Isosoma.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 15. Phytophagic habits of the genus Isosoma; I. grande observed ovipositing.
- 2349. [RILEY, C. V.] [Cranberry fruit-worm.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 15. Names Acrobasis vaccinii as the well-known cranberry fruit-worm.
- 2350. [RILEY, C. V.] [Rhyssa lunator.] < Proc. Ent. Soc. Wash., [30] - March, 1886, v. 1, p. 15. States that Rhyssa [= Thalessa] lunator is parasitic and not lignivorous.
- 2351. [RILEY, C. V.] [Tiphia and Rhipiphorus.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 15. Refers to O. Lugger's statements in regard to the habits of Tiphia and Rhipiphorus as manifestly incorrect.
- 2352. [Riley, C. V.] [Insects attracted to light.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, pp. 15-16. Disfigurement of buildings by the insects and spiders attracted to the electric light on the dome of the Capitol.
- 2353. [RILEY, C. V.] [Parasitic Coleoptera.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 16. Parasitic habits of Aleochara anthomyic [=nitida].
- 2354. [RILEY, C. V.] [Scenopinus.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 16. Larva of Scenopinus sp. infesting the blanket of a Navajo Indian.
- 2355. RILEY, C. V. Annual address of the president. < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, pp. 17-27. Brief comments upon the histories or injuries of Agrotis fennica, Hadena devastatrix, Nematus erichsoni, Phytonomus punctatus, P. nigrirostris, Pulvinaria innumerabilis, Systachus leucophaus, and Phylloxera vastatrix; notes on the egg parasites of the Aeridida; mode of oviposition of some Carabida; ad-
- 2356. [RILEY, C. V.] [Gall-making moths.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 30. Walshia amovphella, previously known as a gall-maker on Amorpha fruticosa, bred from roots of loco weed; Euryptychia saligneana distinct from Padisca scudderiana.

vantages of Washington from an entomological standpoint.

2357. [RILEY, C. V.] Sphida, Grote.] < Proc. Ent. Soc. Wash., [30] March], 1886, v. 1, p. 30. Considers S. obliquata synonymous with Arzama densa.

- 2358. [RILEY, C. V.] [Food of Calopteron and Photinus.] < Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 31.
  - Larva of Calopteron terminale gregarious and lignivorous; Photinus pyralis feeds on snails.
- 2359. RILEY, C. V. A carnivorous butterfly larva. <Science, 30 April, 1886, v. 7, p. 394.
  - Distribution and recorded food-habits of Feniseca tarquinius; Aphididæ the normal food of the same.
- 2360. RILEY, C. V. Entomology. Professor Riley to Dr. Shaffer. <Daily Globe [Keokuk, Iowa], 2 May, 1886. S.-b. No. 63, p. 30. Injuries of and means against Abia caprifolium [= Zarwa inflata].
- 2361. RILEY, C. V. A carnivorous butterfly larva.—Plant-feeding habit of Feniseca tarquinius. <Amer. Nat., June, 1886, v. 20, pp. 556-557.
  - Supposed food-plants of the larva of Feniseca tarquinius; first publication of proof that it feeds on plant-lice; Schizoneura tessellata, Pemphigus fraxinifolii, and P. imbricator the species preyed upon.
- 2362. RILEY, C. V. Thrips—Leaf hoppers. < Gardener's Mo. and Hortic., June, 1886, v. 28, p. 174. S.-b. No. 61, p. 56.
  - Letter to Duncan Rhind; remedies against Erythroneura vitifex [= Typhlocyba vitis].
- 2363. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1885, 1886, pp. 207-343, 1 map, 9 pl. Separate: <Washington: June, 1886, pp. 10+137+10.

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2364. RILEY, C. V. Miscellaneous notes on the work of the Division of Entomology for the season of 1885, prepared by the Entomologist. <Bull. No. 12, Div. Ent. U. S. Dept. Agric. [13 July], 1886, 46 pp. 1 plate.

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2365. R[ILEY], C. V. Hessian-fly. <Suppl. Encyclopædia Britannica, 9th Ed., 1886, v. 3, p. 324, fig.

Natural history, remedies, and figures of Cecidomyia destructor.

- 2366. R[ILEY], C. V. Locust. <Suppl. Encyclopædia Britannica, 9th Ed., 1886, v. 3, pp. 626-628, fig., map.
  - Ravages, life-history, enemies of, and means against Caloptenus spretus; migrations and their cause; map of the region overrun; figure of adult.
- 2367. RILEY, C. V. Some popular fallacies and some new facts regarding Cicada septendecim L. <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, p. 334.
  - Variety cassinii is not the race tredecim of Tibicen septendecim; twigs with eggs do not necessarily break off or die to insure the hatching of the larva.
- 2368. RILEY, C. V. Report of the curator of the department of insects in the U. S. National Museum for 1884. <Ann. Rept. of Regents of Smith. Inst. for 1884, 1885 [1886], pp. 185-188.
  - List of accessions, with notes; recommendations for utilizing the Glover plates; needs of the Department.
- 2369. RILEY, C. V. Notes on Feniseca tarquinius, Fabr. <Ca. Ent., October, 1886, v. 18, pp. 191-193.
  - Comments on article by W. H. Edwards; records made at the Department of Agriculture proving the carnivorous habits of the larva of *Feniseca tarquinius*.
- 2370. RILEY, C. V. Two useful lives. <Sci. Amer., 29 January, 1887, v. 56, p. 64. S.-b. No. 63, p. 122. See: <Wine and Fruit Grower, January, 1887, v. 9, p. 10. S.-b. No. 61, pp. 55-56. Brief obituary notices of Louis Bazille and Jules Lichtenstein.
- 2371. RILEY, C. V. Mr. Hulst's observations on *Pronuba yuccasella*. <Entom. Amer., March, 1887, v. 2, pp. 233-236.

  Criticism of the observations of G. D. Hulst; summary of the method of oviposition of *Pronuba yuccasella*; pollination of *Yucca* by the same.
- 2372. [RILEY, C. V.] Fruit pest extermination. <San Diego Mirror, 5 April, 1887. S.-b. No. 63, pp. 88–89.

  Means against Coccide.
- 2373. [RILEY, C. V.] [Californian orange insects.] < Daily Herald [Los Angeles], 9 April, 1887. S.-b. No. 63, p. 88.

  Means against Coccida.
- 2374. [RILEY, C. V.] Our bugs. <San Francisco Daily Examiner, 16
  April, 1887. S.-b. No. 63, p. 80; 86-87.
  Food-plants, ravages, and means against the white-scale.
- 2375. [RILEY, C. V.] [Remedies and appliances.] < Press and Horticulturist, 16 April, 1887. S.-b. No. 61, pp. 82-84.
  - Replies to inquiries made at the annual convention of the State Board of Horticulture of California; means against the codlin-moth; methods of spraying; differences between allied scales; their methods of dispersal and means against them.
- 2376. RILEY, C. V. Bumble-bees vs. red-clover. <Rural New-Yorker, 23 April, 1887, v. 46, p. 270. S.-b. No. 61, pp. 36–37.
  - Revival of unsettled questions; red-clover sterile in the absence of bumble-bees in New Zealand; some fertilization by other insects probable; introduction of bumble-bees into New Zealand; their rapid propagation there; beneficial effects on red-clover.

2377. RILEY, C. V. Young grasshoppers. <San Francisco Examiner, 25 April, 1887. S.-b. No. 63, p. 85.

Interview with reporter; ravages of and means against Melanoplus [= Caloptenus] devastator.

2378. RILEY, C. V. Our shade trees and their insect defoliators. Being a consideration of the four most injurious species which affect the trees of the capital; with means of destroying them. <Bull. No. 10, Div. Ent. U. S. Dept. Agric. [7 May], 1887, 69, pp. 27 figs.

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| 2380. | RILEY, C. V Variable moulting in Orgyia. <ent. 1887,="" 23,="" 274.="" a="" all="" and="" correlated="" dependent="" discrepancy="" female="" food="" four="" from="" growth="" in="" individual="" is="" larvæ="" less="" leucostigma="" mag.,="" male="" may,="" mo.="" molting="" molts="" molts,="" molts;="" normal="" not="" number="" nutrition.<="" of="" on="" orders="" orgyia="" p.="" rate="" sexes="" sexual="" size="" smaller="" species;="" supply;="" td="" tendency="" the="" there="" three;="" to="" undergoes="" v.="" vary="" when="" whenever="" with=""></ent.> |
| 2381. | RILEY, C. V. Pedigree moth-breeding. <ent. 1887,="" 23,="" 277-278.="" as="" conditions.<="" experiment="" favorable="" insect="" its="" mag.,="" may,="" mo.="" mori="" most="" new="" pp.="" recommends="" sericaria="" td="" tendency="" the="" to="" under="" v.="" vary="" with;=""></ent.>  |
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| 2382. | RILEY, C. V. Reports of observations and experiments in the practical work of the division, made under the direction of the entomologist. <bull. 13,="" 1887,="" 4="" 78="" [3="" agric.="" dept.="" div.="" ent.="" figs.<="" june],="" no.="" pp.,="" s.="" td="" u.=""></bull.>  |
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| 2382. RILEY, C. V.—Continued.  CONTENTS—Continued.  A record of some experiments relating to the effect of the puncture of some hemipterous insects upon shrubs, fruits, and grains, 1886. By F. M. Webster.  Notes from Missouri for the scason of 1886. By M. E. Murtfeldt.  50   |
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| v. 56, p. 384. Sb. No. 61, p. 50. Colman's Rural World, 23  June, 1887, v. 40, p. 185. Sb. No. 61, p. 112. Cardener's  Mo. and Hortic., July, 1887, v. 29, p. 216. Sb. No. 61, p. 111;  138; 148.  Food-plants, habits, description of larva and adult of Haltica punctipennis; the species subdued by arsenical poisons.   |
| 2384. RILEY, C. V. A destructive cricket in Louisiana. <florida 1,="" 1887,="" 1888,="" 2="" 20="" 576.="" 61,="" 64-65.="" 7,="" 87-88.="" <i="" <insect="" against="" and="" dispatch,="" june,="" life,="" means="" no.="" october,="" p.="" pp.="" ravages="" reprint:="" sb.="" v.="">Gryllus sp., destructive to cotton, peas, tobacco, sweet and Irish potatoes.</florida> |
| 2385. RILEY, C.V. Strawberry borers. <pacific 110.="" 1887,="" 25="" 33,="" 559.="" 61,="" 63,="" 90;="" a="" a.="" against="" as="" bisulphide="" carbon="" egeria="" i.="" impropria.<="" june,="" letter="" means="" no.="" of="" p.="" press,="" recommends="" rural="" sb.="" td="" to="" v.="" wilcox;=""></pacific>  |
| 2386. RILEY, C. V. Life-history of the Icerya. <pacific 1886.="" 1887,="" 2="" 2394="" 25="" 33-34,="" 565;="" 60-64,="" 61,="" 9="" 9.="" advance="" agriculture="" commissioner="" contents.<="" figs.="" for="" from="" july,="" june,="" no.="" of="" p.="" pp.="" press,="" proof="" report="" rural="" s.="" sb.="" see="" synopsis="" td="" u.="" v.=""></pacific>         |
| 2387. [RILEY, C.V.] Cut-worms. < Pacific Rural Press, 25 June, 1887, v. 33, p. 578. S. b. No. 63, p. 108.  Means against cut-worms.   |
| 2388. RILEY, C. V. Reports of observations and experiments in the   |

2388. RILEY, C. V. Reports of observations and experiments in the practical work of the division made under the direction of the entomologist. <Bull. No. 14, Div. Ent. U. S. Dept. Agric.

[3 August], 1887, 62 pp., 1 pl., 4 figs.

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| Agric. [18 August], 1887, 40 pp. San Diego Union, 16 Ap  | ril, |
| 1887 S.h No 61 nn 90-97 (Los Angeles 13 April 19   | 887  |

S.-b. No. 61, pp. 97–104. <Los Angeles Tribune, 14 April, 1887. S.-b. No. 61, pp. 104–111. See: <Pacific Rural Press, 23 April, 1887, v. 33, pp. 361–362; 364. S.-b. No. 61, p. 48; No. 63, p. 76. <Riverside Daily Press, 12, 13 April, 1887. S.-b. No. 61, pp. 65–68; No. 63, pp. 98–105. <Press and Horticulturist, 16 April, 1887. S.-b. No. 61, pp. 74–82. <Florida Dispatch, 2 May, 1887, v. 7, pp. 385–388. S.-b. No. 63, pp. 75; 77. <Pacific Rural Press, 2 July, 1887, v. 34, p. 9.

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2390. [RILEY, C.V.] [Classification of insects.] <Entom. Amer., September 1887, v. 3, p. 102.

Comments on the address of J. H. Comstock before the A. A. A. S.

- 2391. [RILEY, C. V.] [Pronuba and its connection with the pollination of Yucca.] <Entom. Amer., September, 1887, v. 3, pp. 107-108. Record of the results of recent experiments on the pollination of Yucca and the agency of Pronuba in this work.
- 2392. RILEY, C. V. Beschreibung einer den Birnen schädlichen Gallmücke (? Diplosis nigra Meig.). <Wiener Entomol. Zeit., September, 1887, v. 6, pp. 201–206, 3 figs.
  - Discovery of the species in America; its habits and life-history; detailed description of all stages; possible difference between European and American specimens; suggests *D. pyrivora* for the latter, if distinct.
- 2393. RILEY, C. V. Some important discoveries in the life-history of the hop-plant louse (*Phorodon humuli* Schrank). <Soc. for Prom. Agric. Sci., September, 1887, 1, No. 9, p. 205. Reprint: <Sci. Amer. Suppl., 24 September, 1887, v. 24, p. 9781. S.-b. No. 61, pp. 117–119. <Gardener's Mo. and Hortic., October, 1887, v. pp. 369–311. S.-b. No. 61, p. 124.
  - Résumé of recent discoveries in the life-history of *Phorodon humuli*; proof of its migration from plum to hop; life of the egg on plum in winter; spring migration to hop; number of broods thus far observed; probable course of later broods.
- 2394. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1886, 1887, pp. 459-592, 11 pl. Separate: <Washington, September, 1887, pp. 459-592+6+9, 11 pl.

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| 2395. RILEY, C. V. The Hessian-fly in England; its origin; its partite future. <london 144-147.="" 17="" 1887.="" <i="" date="" introduction="" no.="" october,="" of="" pp.="" sb.="" the="" times,="">Cecidomyia destructor into England; probabilithat it has been introduced from continental Europe since the time</london>   | 61,         |

2396. RILEY, C. V. The problem of the hop-plant lonse fully solved. <Gardener's Chronicle, 22 October, 1887. S.-b. No. 61, pp. 133–135. Reprint: <Mark Lane Express, 31 October, 1887, v. 57, pp. 135–137. S.-b. No. 63, pp. 136–140.

Curtis; conditions in Great Britain unfavorable for its increase.

Life-history, migrations, and mode of hibernation of Phorodon humuli.

2397. RILEY, C. V. On the luminous larviform females of the *Phengo-dini*. <Ent. Mo. Mag., [December], 1887, v. 24, pp. 148-149.

Structural characters of the larval *Phengodini*; food of *Zarhipis*; characters of eggs, young larvæ, and female larvæ of *Zarhipis* and *Phengodes*; female *Phengodini* considered an archetypal hexapodal form; relations between phosphorescence and differentiation of the sexes.

- 2398. RILEY, C. V. [Introduction of the Hessian-fly into England.] <a href="Trans.">Trans.</a> Ent. Soc. London, [December], 1887, pp. 45-48, Proc. Discussion of the date of introduction of Cecidomyia destructor into America and England; concludes from a study of the historical evidence, the distribution and parasites of the insect, that it was probably introduced into England about three or four years ago.
- 2399. RILEY, C. V. Poisonous insects. <Reference Handbook of the Medical Sciences, 1887, v. 5, pp. 741-760, figs. 2971-3020.

  An exhaustive illustrative review of the Arachnida, Myriapoda, and Hexapoda which secrete a poison injurious to man; descriptions of their life-histories; the manner in which the injury is inflicted and the remedies for the same.
- 2400. RILEY, C. V. The problem of the hop-plant louse [Phorodon humuli, Schrank] in Europe and America. <Rept. Brit. Assoc. Adv. Sci., 1887, pp. 750-753. Separate: <pp. 1-3. See: <Nature, 13 October, 1887, v. 36, pp. 566-567. <Gardener's Chronicle, 17 September, 1887. S.-b. No. 61, pp. 333-334.
  - Life-habits of *Phorodon humuli*; effects of extreme heat and of meterological conditions; natural enemies and means against the *Phorodon*.
- 2401. RILEY, C. V. On *Icerya purchasi*, an insect injurious to fruit trees. <Rept. Brit. Assoc. Adv. Sci., 1887, p. 767. Separate: .<p. 1. See: <Nature, 20 October, 1887, v. 36, p. 592.
  - Summary statement of food-plants, original home, synonomy, and means against Icerya purchasi.
- 2402. RILEY, C. V. On the luminous larviform females in the *Phengodini*. <Rept. Brit. Assoc. Adv. Sci., 1887, pp. 760-761. Separate: <pp. 1-2. See: <Entom. Amer., September, 1887, v. 3, p. 107. <Proc. Amer. Assoc. Adv. Sci., 1887 [May, 1888], v. 36, p. 262.
  - Résumé of facts relating to the history, characters, and life-habits of the luminous larviform females in the *Phengodini*; bearing of these facts on the theory of evolution.
- 2403. RILEY, C. V. [Scale on *Euonymus latifolia*?] <Sci. Amer., 14
  January, 1888, v. 58, p. 27. S.-b. No. 61, p. 148.

  Means against *Chionaspis euonymi* and other *Coecida*; formulæ of kerosene emulsions.
- 2404. [RILEY, C. V.] [Larval habits of Lixus.] < Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 33.

  Lixus macer bred from stems of Chenopodium hybridum and from Helianthus; larva of L. parcus a gall producer on stems of Amelanchier.
- 2405. [RILEY, C. V.] [Girdling habits of Pædisca obfuscata.] < Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 33.

  Larva of P. obfuscata spins a web over the orifice at the amputated end.
- 2406. [RILEY, C. V.] [Early stages of Aphorista vittata and Epipocus punctatus.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 37.
  - Comparative characters between corresponding stages of the two species.

- 2407. [RILEY, C. V.] [Food-habits of Feniseca tarquinius.] < Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 37.
  List of Aphidida preyed upon by larvæ of F. tarquinius.
- 2408. [RILEY, C. V.] Notes on *Phengodes* and *Zarhipis*. < Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 62-63.
  - Structural characters of the luminous larvæ of *Phengodes* and *Zarhipis* and of an unnamed form from Nevada; difference between the perfect female and the larva.
- 2409. [RILEY, C. V.] [Trees injured by spiders.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 84.
  Growth of trees retarded by spider-webs.
- 2410. [RILEY, C. V.] [Remarks on exhibited specimens.] < Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 84-86.
  - 1. Notes on the life-habits of Ægeriidæ. Habits and early stages of Melittia gloriosa, Sciapteron robiniæ, Phemonoe 5-candata, Ægeria impropria, A. albicornis, and A. pyri.
  - 2. Color variation in the larva of *Agraulis vanillæ*. Colorational variation between eastern and western larvæ of *A. vanillæ*.
  - 3. Miscellaneous insects. Food-plants of Eumenia atala and Cloantha derupta; habitat of Dendrotettix quercus n. g. et sp.
- 2411. RILEY, C. V. Further notes on *Phengodes* and *Zarhipis*. <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 86–87.
  - Comparative characters of the larvæ of *Phengodes* and *Zarhipis*; life-habits and metamorphoses of the same; colorational and structural characters of the larva and larviform female of *Zarhipis*; description of the eggs of *Zarhipis*.
- 2412. [RILEY, C. V.] [Remarks on exhibited specimens.] < Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 87-89.
  - 1. Notes on the eversible glands in larvæ of *Orgyia* and *Parorgyia*, with notes on the synonomy of species. Presence of glands, probably scent organs, in the larvæ of *Orgyia* and *Parorgyia*; synonomy and food-plants of some species of *Parorgyia*.
  - 2. Further remarks on *Phengodes*. Comparative characters of larva and larviform females of *Phengodes laticollis*.
  - 3. Interesting Lepidoptera. Characters of Syntomeida sp., and of an undetermined moth.
- 2413. RILEY, C. V. The British pest. Worthlessness of the sparrow as an insect-killer. <National Tribune, 26 April, 1888.
  - Result of the examination of the stomach contents of 522 sparrows, of which 92 only, or  $17\frac{6}{10}$  per cent., contained insects, a large proportion of these being innoxious or actually beneficial species; review of recorded observations in North America.
- 2414. RILEY, C. V. Elm-tree depredators. <Newark [N. J.] Press and Register, 10 May, 1888.
  - Report of an address before the Newark Board of Trade; life-history and means against Galeruca xanthomelæna.
- 2415. RILEY, C. V. On the original habitat of *Icerya purchasi*. < Pacific Rural Press, 12 May, 1888, v. 35, p. 425.
  - Australia probably the true home of Icerya purchasi; its distinctness from I. sacchari.

2416. RILEY, C. V. The buffalo-gnat problem in the lower Mississippi Valley. Abstract: <Proc. Amer. Assoc. Adv. Sci. for 1887, [May], 1888, v. 36, p. 362.

Result of late investigations on species of Simulium.

2417. RILEY, C. V. Systematic relations of *Platypsyllus*, as determined by the larva. <Sci. Amer. Suppl., 2 June, 1888, v. 25, pp. 10356-10358, 4 figs.

Review of the literature concerning the systematic position of *Platypsyllus* castoris; additional facts confirming G. H. Horn's view of the coleopterous nature of the insect.

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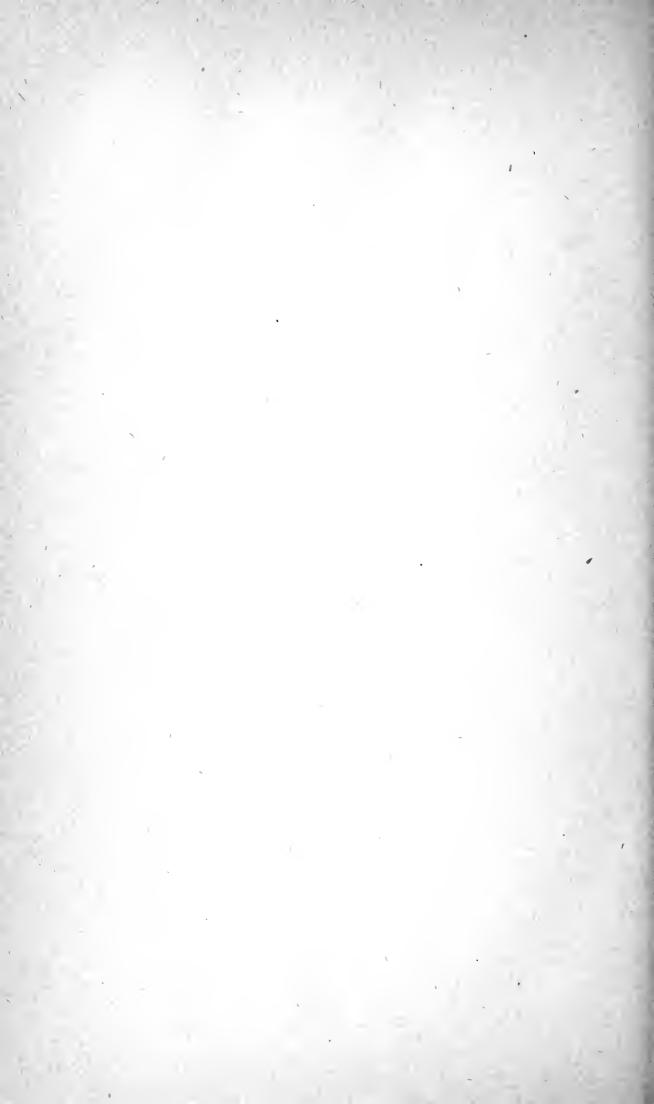
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## BIBLIOGRAPHY

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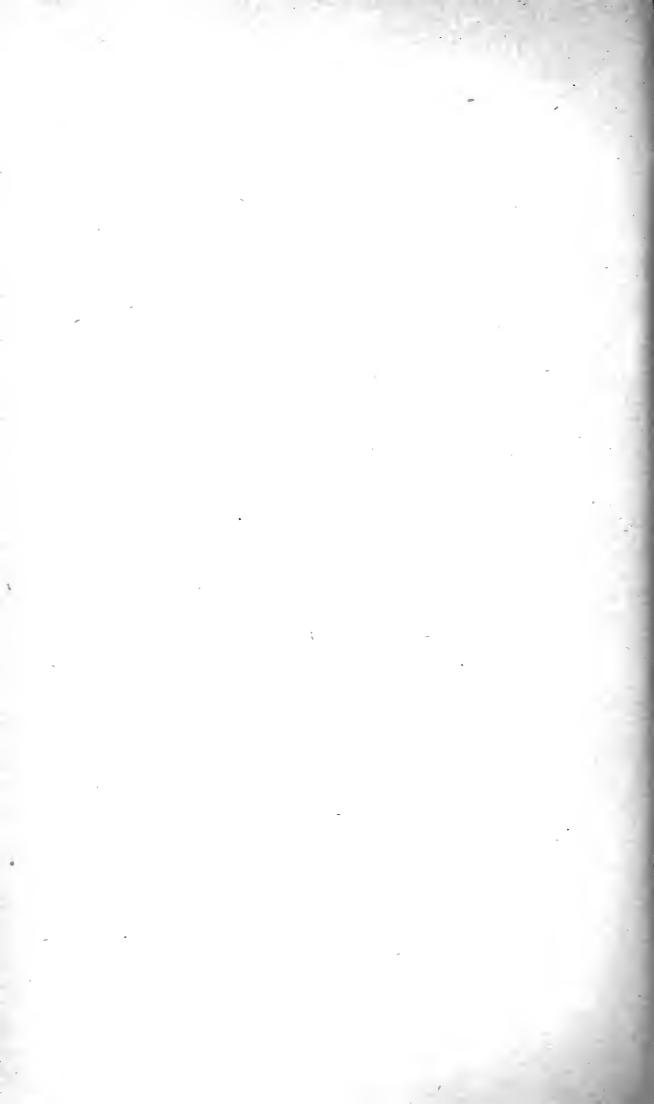
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## INDICES TO PARTS I, II, AND III.

## SYSTEMATIC INDEX OF THE NEW NAMES PROPOSED BY B. D. WALSH AND BY WALSH AND RILEY.

[The Walsh and Riley names are followed by W. & R. The first number following the name refers to the number of the paper in the list, the second to the page where the species is first described. As is well known, the Walsh collection was destroyed in the Chicago fire in October, 1871. A few of the types sent to Drs. Hagen and Riley are in the collections of the Museum of Comparative Zoology at Cambridge and the National Museum at Washington. Those at Cambridge are indicated by a \*, those at Washington by \*\*.]

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[The types, without exception, are preserved in the collection of the National Museum, Washington, D. C.]

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<sup>\*</sup>Described and figured in A. S. Fuller's "Injurious insects." <Tilton's Journ. of Hortic. and Florist's Companion, October, 1868, v. 4, pp. 207-209.

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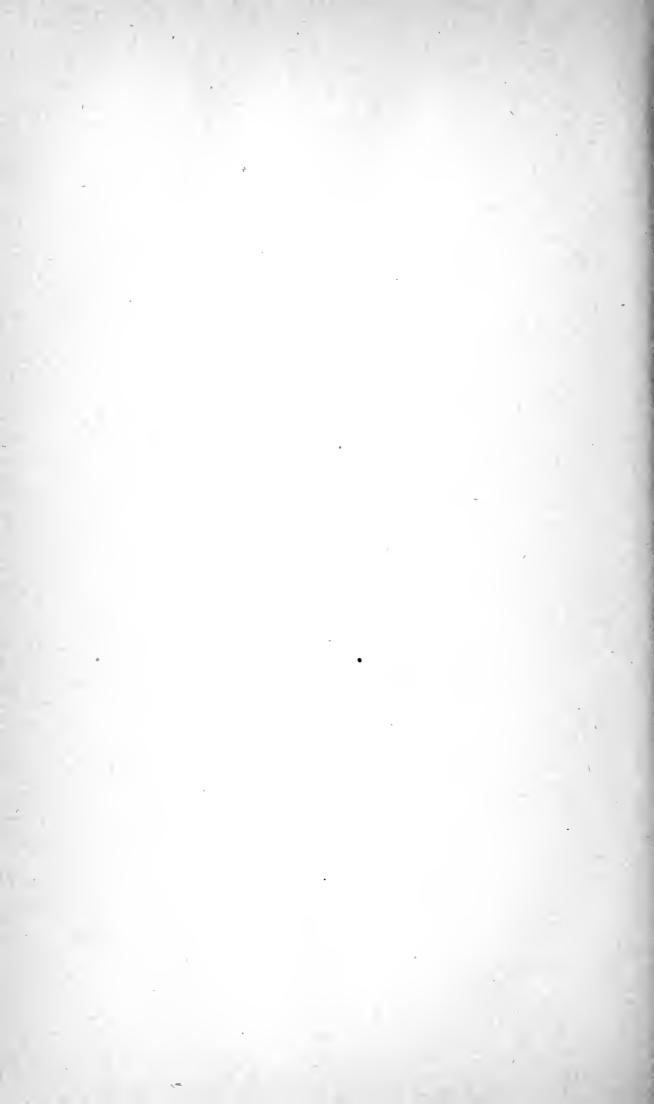
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<sup>&</sup>lt;sup>1</sup> Described and figured in Lintner's First Report N. Y. State Entomologist, p. 159.

<sup>&</sup>lt;sup>2</sup> Proposed (Record of Amer. Ent., 1871, p. 8) for Trichogramma minutum. Pentarthron has, however, been used for a genns of beetles.



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